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JANUARY 1992

MacUser

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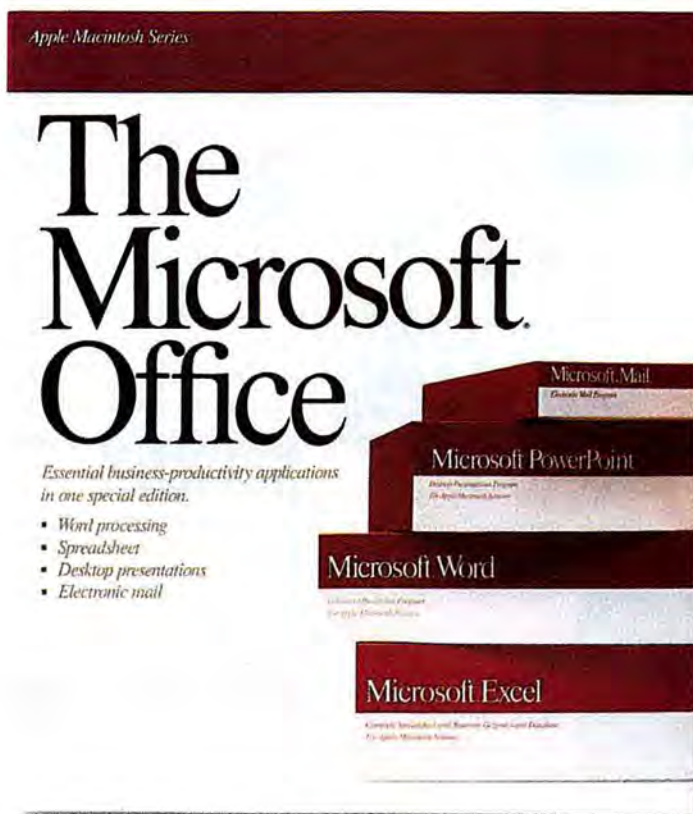
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JANUARY 1992

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Cover photo by Fred Stimson



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*"The first thing
the boneheads
at IBM will do
is change the
name of the Mac
to some dopey
number."* 316



Guy's got company.



Guy Kawasaki, Macintosh Evangelist

TouchBASE is the personal contacts database that's loaded with powerful features, yet very easy to learn and use. Guy says it's the most functional piece of Macintosh software he's seen. But he's not the only one who's sold. Here's what others say:

"TouchBASE is the first product I've seen that is actually easier to use than the good old, reliable Rolodex."

Don Crabb, Byte

"TouchBASE version 2.0 is the top of the heap for contacts management software."

Steve Bobker, MacUser and Computer Shopper

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Phillip Robinson, San Jose Mercury News

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Becky Waring, MacWeek

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Ken Gruberman, MacValley Review

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If you have a question or problem or a tip to share, write to Help Folder or Tip Sheet, respectively, c/o *MacUser*, at the above address. If you are interested in contributing to our utilities disk or labs-benchmark disk series, write to Michele Hasson at *MacUser*. For more help, you can take advantage of local user groups. Call Apple toll-free at (800) 538-9696, ext. 500, for information.

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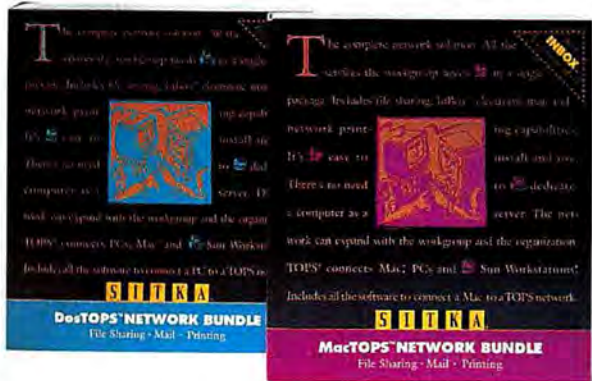


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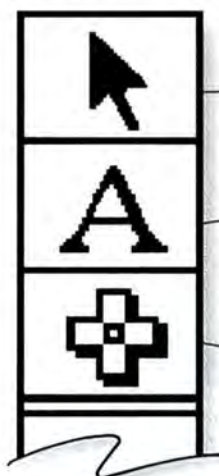
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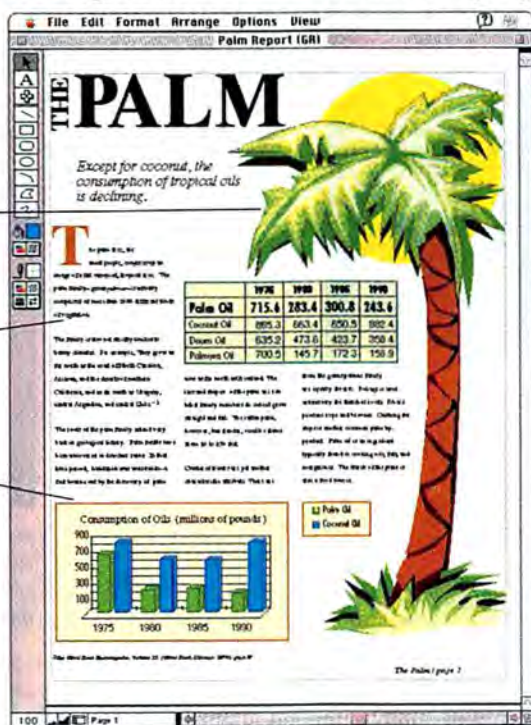
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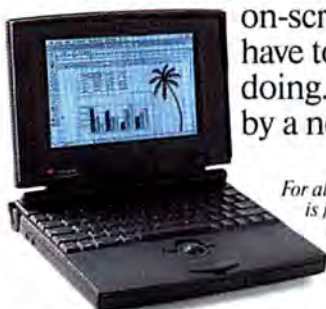
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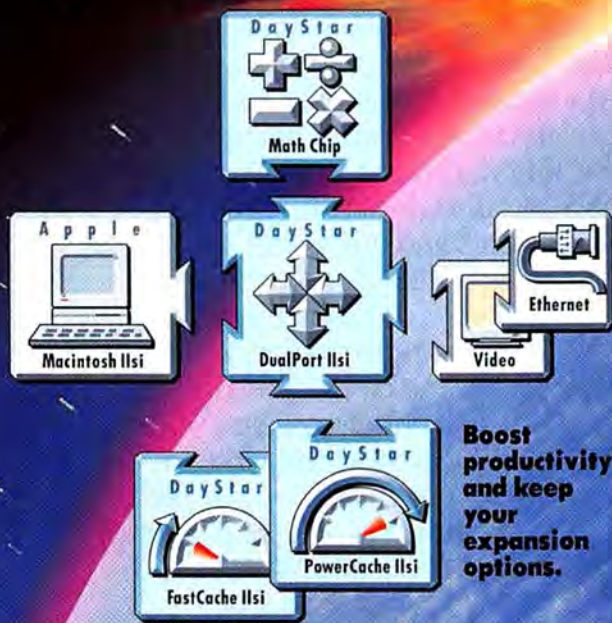
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About

MacUser

The Purple Decade

We're far enough into the '90s for magazine writers to begin characterizing the decade. Here's our characterization. In past decades, people worried about the emphasis of style over substance, but in the '90s, style *is* substance.

Your first Macintosh style tip for the '90s, then, is: Think purple. *MacUser* technical director Henry Bortman has surveyed the Apple/IBM agreements, the new joint ventures (Taligent and Kaleida), and the legendary million lines of code and sees a '90s purple muting the clashing of the '80s Apple red and IBM blue (see page 47).

The '90s are definitely a time for accessorizing. In this issue, Zmac manager Ben Templin shows you how to swank up System 7 with trendy new utilities, from supercharged search engines to totally awesome cut-and-paste video clips, many available on Zmac (see page 94). And for the Mac on the go, contributing editor Steven Bobker, in his column on accessorizing the new PowerBooks, looks at what jet-set Macs will be wearing (see page 193).



MacUser senior editor Kelli Wiseth and the Macintosh that is the closest Apple's come yet to a real workstation: the Quadra 900.

Perhaps the most important '90s accessory is the one that holds the most accessories. You'll learn about how next-generation removable-magnetic-cartridge drives offer infinite capacity (for storing those accessories — and applications and data, of course) and easy data transport (you *can* take them with you) in our lab report on storage in the '90s — 90-megabyte removable-magnetic-cartridge drives, that is, edited by associate editor Mark Frost (see page 126).

Macintosh style in the '90s is more than skin deep. Take a look at the new, more muscular Macs in our lab report on two converging trends of the '90s, the pumping up of the Mac and the pricing down of traditional workstations, edited by senior editor Kelli Wiseth. The Mac Quadra, Apple's answer to Linda Hamilton, takes on the big boys, including the DECstation 3100, NeXTstation, Personal IRIS, and SPARCstation IPC, in a match where SPECmarks tell some — but not all — of the story.

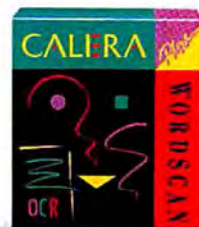
According to Kelli, this generation of workstations points to a whole new direction for computers in the '90s, where what the box is will become less important and interoperability will matter more. Kelli believes that distributed processing will be hot, that RISC-based processing will be the '90s norm, and that the purple SGI Indigo workstation is the coolest. She means the color of the case. (See "When Worlds Collide: Macs Versus Workstations," page 112.)

And in the back of the book, our official critic/cynic, Mr. John C. Dvorak, makes his own inimitable fashion statement: He's blue over purple, and he doesn't mean the color of the case. ☞

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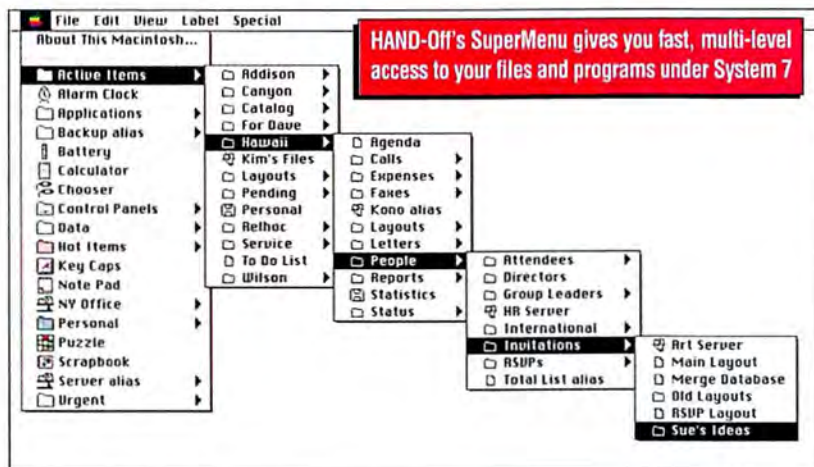
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Here's how the new System 7.0 savvy version can make your Macintosh even more productive.

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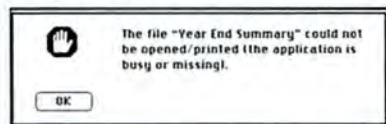
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— MacUser, February 1991



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Ross T. Carter, of Frankfort, Kentucky, surprised us with evidence that plans for the Mac originated centuries ago. England's Queen Elizabeth I was ahead of all of us. "She apparently registered her frustration with the Mac-less 16th century by appending the Apple Command-key symbol to her signature." Next we'll be hearing that the Montgolfiers anticipated Balloon Help.

Elizabeth

✉ Write to Letters to the Editor, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404, or post your letter on the MacUser Forum of Zmac, our on-line service.

All letters become the property of MacUser, and we reserve the right to edit any letters we print. Please include a return address and a daytime phone number.

The Persistent Type

In "Dueling Font Standards" (October '91, page 165), Kathleen Tinkel advises those of us who have PostScript files and equipment, regularly send files to service bureaus for output, or have sizable investments in Type 1 fonts to "avoid TrueType for the time being."

The same article warns, however, that installing System 7 automatically replaces the existing Times, Helvetica, Symbol, and Courier fonts with their TrueType versions. Should we therefore conclude that it would be best to also avoid System 7 for the time being?

Richard A. Hathaway
New York, NY

You can easily remove the TrueType fonts that the System 7 Installer automatically places in the System file. Helvetica, Times, Symbol, and Courier can be replaced with Type 1 equivalents, but you may want to keep the TrueType fonts for Chicago, Geneva, Monaco, and New York, because they're much better looking than the older bit-mapped versions. And Type 1 users have even more reason to rejoice — Apple and Adobe have announced that ATM and Type 1 fonts will be built in to future versions of system software, so you can choose freely between Type 1 and TrueType fonts. — KT

Flurries Expected

The article "Breaking In to TV," by Salvatore Parascandolo (September '91, page 248), was very interesting. I have a Mac LC with a

12-inch RGB monitor and decided to try setting up a TV monitor on the system to do some demonstrations. I connected everything, turned on the system, and got only snow on the TV. Is an additional ground connection required to make this setup work? Any ideas?

Grant S. Huglin
Puyallup, WA

Unfortunately, none of the Macs with built-in video systems can synchronize to NTSC signals. These machines include the IIci, the IIsi, and the LC. With the IIci, you can simply add suitable NTSC-capable video boards such as the Apple 8•24 video card in a NuBus slot. The IIsi can use a NuBus adapter card and an NTSC-capable video board. The bad news is that the only solution for the LC is a scan converter, which costs at least \$2,500.

Regardless of which Mac you own, be sure to restart once you've hooked everything up, or all you'll get is vertical lines. — SP

Credit Check

Although delighted with your article on Ofoto ("Image Makers," November '91, page 98), I was uneasy at being given all the credit for RenderMan and Ofoto. I played a key role in their development, but both projects were team efforts. I did the original RenderMan research with Loren Carpenter in 1983 and wrote the original program, but it has been significantly improved and extended by several people since then. I did most of the research behind Ofoto, but the program was

Dear Mr. Sculley . . .

Apple and IBM put megabucks and plenty of time into choosing names for their new joint ventures. They finally decided on Kaleida for the company that will develop multimedia standards and Taligent for the one that will create a new operating system. It occurred to us that they could have saved time and money if they'd polled our readers first.

Speak Up:
What are more-suitable names for the Apple/IBM joint-venture companies?

✉ Send your thoughts to Dear Mr. Sculley, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

In response to October's question about the need for two type standards, "William," of Stamford, Connecticut, scolds Apple: "Typefaces are just typefaces! After purchasing more than \$8,000 worth of Adobe typefaces, what are the chances my corporation would say, 'Oh, there's a new standard in type; let's buy a bunch of those

tool!' TrueType is a slap in the face from Apple, scurvy dogs. What were those specifications on the NeXT cube?"

Monitoring conversation on GENIE and America Online, Steve Nicholson, of Davis, California, finds that the consensus is that "the last thing we need is two font standards. People see TrueType as Apple's grab at all that money that's been going to Adobe for PostScript licenses. I guarantee you that I'll be avoiding TrueType as much as I do viruses."

Karsten Sethre, of Austin, Texas, on the other hand, is happy about the double option: "After using both type standards extensively, I have found no great difference in speed and see several advantages to TrueType over Type 1 fonts."

"I can't seem to load very many fonts, using ATM, even with ATM's Font Cache set dangerously high. I have no such problems with TrueType. Type 1 fonts are harder to install and remove. Also, TrueType can be used with any Macintosh-compatible printer without special hardware or software."

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LETTERS

developed by a great team of engineers. Rob Lay was the project leader, Ken Carson was the senior engineer, and Gary Poon was the principal Macintosh engineer. Eric Herrmann, Jason Winchell, and Rocky Offner came in later in the project and helped significantly. Dave Latham, Barbara Troast, and Maureen Garrett provided support in testing and administration. As one who has been left out of credits myself in the past, I would appreciate your printing this to acknowledge the team nature of these efforts.

Rob Cook
Light Source, Inc.
Greenbrae, CA

Science of Indexing

In the September '91 issue, the useful and informative review of bibliographic-database programs ("EndNote Plus, Bookends Mac, and Publish or Perish," page 62) omitted Reference Manager, from Research Information Systems (2355 Camino Vida Roble, Carlsbad, CA 92009; [619] 438-5526). This bibliographic-database program was developed by scientists to aid the most compulsive group of writers who use large bibliographies: scientists. Before acceptance, research manuscripts are typically submitted to two or three journals, which may have different bibliographic formats.

Reference Manager indexes by reference number, author, editor, journal, year, or keywords, and it searches by words in the title or notes. This program lets me avoid typing a reference more than once.

Frank F. Vincenzi
Seattle, WA

I appreciated Ted Landau's September '91 review of bibliographic databases. Unfortunately, none of the reviewed products can do what I want. I'm looking for a database program that can record various types of information—variables, means, and standard deviation—as well as generate a reference list the way EndNote Plus can. Do you know of any database program that has both functions? What about Pro-Cite?

William M. Gray
Toledo, OH

I'm not aware of any program that is specifically designed to handle the two kinds of database functions you describe. However, most bibliographic databases (including EndNote Plus) have a Notes and/or Abstract field where information can be entered. These fields need not be

part of any final bibliographic output, so perhaps this could satisfy your requirements. Pro-Cite 2.0 was recently announced by Personal Bibliographic Software (P.O. Box 4250, Ann Arbor, MI 48106; [313] 996-1580), but I cannot comment yet on how the new version compares with EndNote Plus.—TL

Food-Chain Gang

Andy Ihnatko's tip (Help Folder, October '91, page 231) about using panty hose to bugproof your Mac is one of his best yet—especially considering that computer insurance usually doesn't cover vermin. My experience with vermin has thankfully been limited to two species: very small yellow spiders and the smaller-than-a-pinhead bloodsucking mites that, when squooshed against the plastic case of the monitor, leave a surprisingly large blood smear. The spiders may be hunting the bloodsucking mites, which are hunting me, putting me at the bottom of this particular food chain.

Personally, I cannot see myself purchasing (or shoplifting) queen-sized panty hose at my local drugstore—it just doesn't fit my self-image. This may be an opportunity for an imaginative entrepreneur to start a mail-order business in SoftBugShields for the Mac.

Lawrence San
Boston, MA

Righting ROMs

Within the last month, it has come to my attention that three Mac models—the SE/30, the IIfx, and the IIfx—were manufactured with defective ROMs. These "dirty" ROMs are apparently unable to address more than 8 megabytes of DRAM or 14 megabytes of RAM, using virtual memory. Additionally, these flawed ROMs cannot take full advantage of software that uses 32-bit addressing.

I refer to these objectionable ROMs as defective because of Apple's product descriptions and advertising. The technical specification sheets for these Macs describe a full 32-bit 68030 microprocessor and a promise that "when denser chips become available, the Macintosh (SE/30, IIfx, IIfx) can be upgraded to 32 megabytes of RAM." The dirty ROM in my machine denies me unrestricted access to new expanded memory benefits.

Hedgman Dent Smith
Greensboro, NC

Defective and dirty are not the right terms for the ROMs in your SE/30: Older

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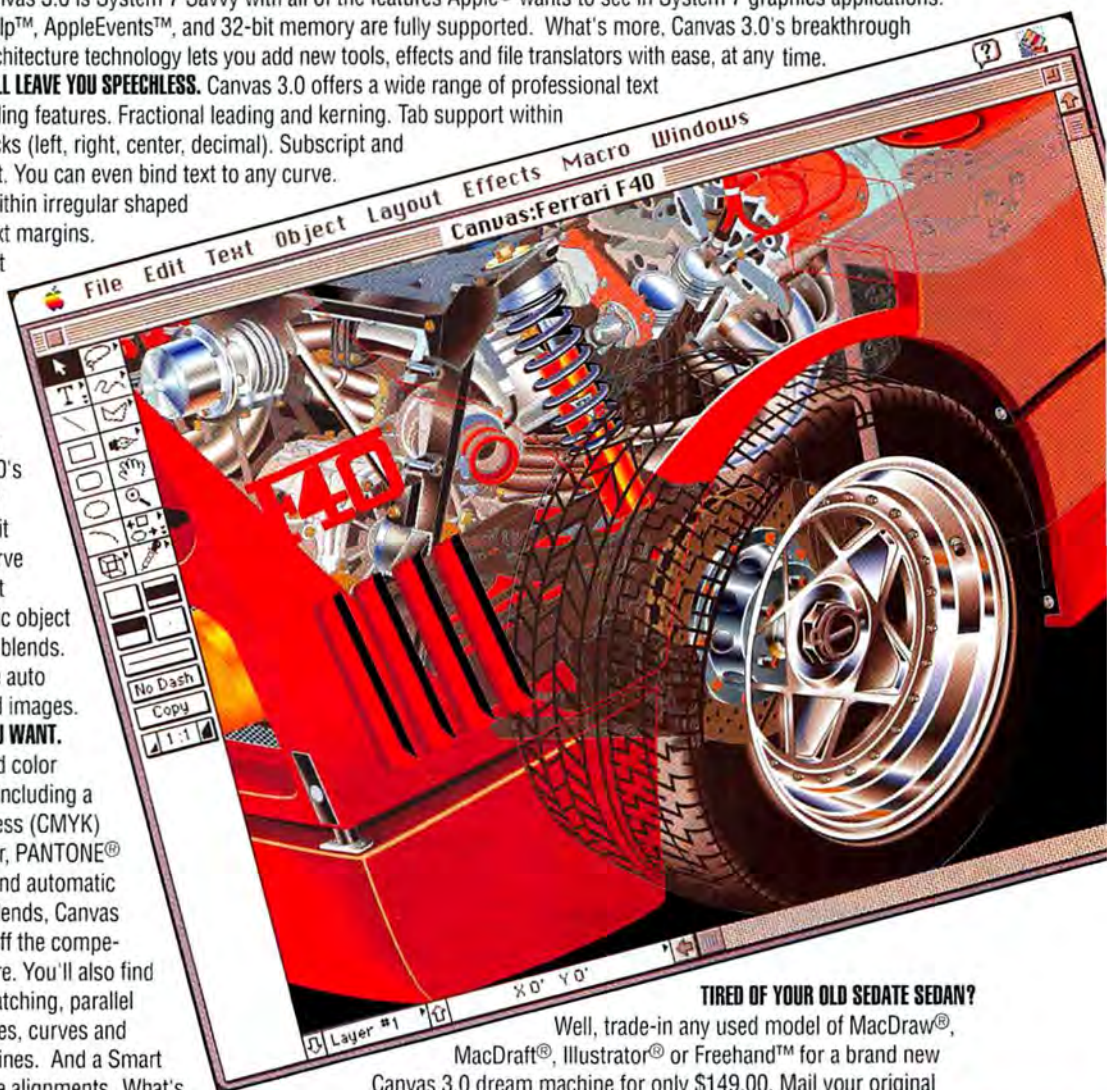
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LETTERS

is more like it. Macs with 32-bit-clean ROMs started shipping on Mac models later than the IIcx. Apple has announced a software upgrade that gives 32-bit cleanliness to an SE/30, II, IIx, or IIcx: Connectix's Mode32, which you can get free from on-line services such as CompuServe or America Online, your local user group, or dealer. Users who purchased Mode32 before last September can get a rebate. Eventually Apple will build this capability in to the Mac's system software. —JR

10BASE-T for Two

You have said that existing phone cabling (unshielded twisted-pair wiring) could be used as cabling for 10BASE-T ("Instant Ethernet: 10BASE-T," September '91, page 174). Do you mean that it can support phone conversations and Ethernet transmissions on the same cabling and in parallel?

D. Pirotte
Brussels, Belgium

You've honed in on one of the strongest selling points of 10BASE-T — being able to use existing phone cables. But not all cables support it. Phone cabling, at least in the U.S., typically consists of two pairs of wire, one pair for the phone and an extra, unused pair for a second phone line. You can use that extra line for 10BASE-T, but only if the wire meets certain specifications. Check with your telephone company to find out whether your wires are usable. —KW

Speed Limit

Your publication, as one of the most influential for Mac users, should make a stronger effort to consider after-sale support in your product evaluations. Please make your recommendations a better indicator of total life-cycle expectations, not just a speedometer check.

David W. Cormany
Aledo, TX

We agree that it's important how well vendors support their products after you've paid your hard-earned cash — especially in the competitive mass-storage market. In fact, at the MacUser Storage Summit, held in August '91, we discussed with dozens of industry leaders how we might best test technical support, customer service, and a host of other criteria unrelated to mere "speedometer checking." Be sure to tune in soon for a whole new way to evaluate the world of mass storage. —RM

Computer Alchemy

When I lugged my Mac Classic into the office, it caused immediate MacEnvy among the younger Ph.D. candidates. Now the IBMs here are being used solely to play Tetris and Mah Jong. But here's the problem: These people insist that an Atari with a Mac emulator will run faster than the equitably priced Classic. The most ardent ones insist that they use Word, ChemDraw, and Chem 3D without any compatibility problems. Where can I get a copy of that virus that infects only the Atari-based Mac emulator?

Roberto Ma. S. Gregorius
Mainz, Germany

The Atari solution may be cheaper and useful for some, but bear in mind that you get what you pay for. Compatibility with new and future versions of the operating system is never guaranteed with an emulator. Because the price/performance ratio of Macs is continually improving, you'd almost certainly be better off getting a low-cost Mac. —SS

Dark Shadow

The After Dark screen saver that you gave a four-and-a-half mouse rating (October '91, page 87) was the source of system errors and printing failure on my Mac. Aldus informed me that After Dark may be the INIT that blocks FreeHand's path when it tries to find graphic links to my files. After I removed it from my system, these problems stopped. Do you know any more about this?

Melinda Wheatley
Halifax, Nova Scotia
Canada

We haven't heard of conflicts between FreeHand and After Dark, and neither has tech support at Berkeley Systems, maker of After Dark. It sounds as if you came up with one solution, removing the INIT. But if you miss Mowin' Man and the newest fish, try activating the SystemIQ activity monitor, accessible via After Dark's When button in its control panel. It instructs After Dark to slow its processes so it won't interfere with background activity. —BM

Too SoftPC

In October's "Letters to the Editor" (page 13), you suggested using SoftPC to someone who needed to satisfy the office requirement of using DOS. Maybe you need to take another look at SoftPC. I purchased it recently (for \$249) and was sadly disappointed. Its performance is

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pitifully slow, it supports only CGA graphics, and so far I have found only approximately 30-percent compatibility with the products I want to use. It doesn't work with version 3.0 of Lotus 1-2-3, for example. I would hardly call SoftPC a solution to anything. PCs and compatibles have come a long way from 8086 processing and CGA graphics.

Christopher Gordon
Ventura, CA

You're correct: SoftPC doesn't support Lotus 1-2-3's DOS version 3.0, but you can use 1-2-3 for Mac, which is even better. Try calling Insignia for an upgrade of SoftPC: It has supported VGA graphics for some time now. (Insignia Solutions, 526 Clyde Avenue, Mountain View, CA 94043; [415] 694-7600.)—JR

In nearly every issue, you tout the virtues of SoftPC to readers who wish to use PC or AT programs with a Mac. I have found that it doesn't provide a satisfactory substitute for a PC. I have only two programs with features I haven't found in Mac software: a scientific word processor (PS) and a popular text editor with powerful macro capabilities (KEDIT). Unfortunately, SoftPC doesn't support either of these programs very well. In SoftPC's AT mode, KEDIT's cursor is invisible and the word processor shows the correct symbols only in AT mode. Furthermore, attempts to send output from the word processor to a laser printer cause the Mac to lock up. The bottom line is that the programs don't run on a Mac with SoftPC the way they do on an IBM.

Bruce W. Shore
Livermore, CA

You might find your answer in using Mac products. There are several Mac solutions for typing mathematical equations. Expressionist, from Prescience ([415] 543-2252), is a good mathematical-text-setting utility (\$129.95). You might also try MathWriter, a scientific word processor from Brooks/Cole Publishing ([408] 373-0728), which we reviewed in November '91 (page 87).

Blue Sky Research ([503] 222-9571) has a Mac product called TEXTures (based on the popular DOS public-domain program). Classic TEXTures (\$695) is a package that bundles TEXTures with fonts and a macro package. Speaking of fonts, Monotype ([312] 885-1440) has a scientific font called Pi Fonts that works with any Mac word processor.—JR

Wife-Support System

What on earth could Guy Kawasaki be trying to tell me in his column "My Life As a Wife" (October '91, page 29)? That he's totally uncomfortable in his role as a wife, which is why he felt compelled to justify his absence from employment by name dropping. So what if he took advanced placement in high school, works out with Jerry Rice, owns a Porsche 911, and has a wife who knows Spike Lee. This is a computer magazine, Guy. If I want to read about teriyaki chicken, I'll buy *Good Housekeeping*.

I agree with Steve Jobs. Do something important with your life again. Stick to computers, and stop attempting to work copy around your social status.

Melinda Wheatley
Halifax, Nova Scotia
Canada

Please ask Guy Kawasaki to write about computers. Having read his books, which I found fascinating, I think it's a waste of talent to write columns like the one in October.

Viriam Khalsa
Eugene, OR

I was happy to see Guy Kawasaki address the topic of wifehood in his October column, but I must point out a technical error. Perhaps, under ideal testing conditions in the relatively dry climate of California, Guy can let laundry sit in the washer for two days before rebooting. However, in the incredibly humid climate of southern New Jersey, one day is the limit. I realize that ZD Labs might not have enough washing machines on the network to check this, but you might consider a strategic alliance with *Good Housekeeping*.

Bill Johnson
Maple Shade, NJ

Clarifications

Because the QMS-PS 2210 printer is sold and serviced exclusively by QMS' direct sales force, there is no street price as listed in the features table of "Getting Down to Business: Workgroup Printers" (September '91, page 128). The list price cited, \$9,995, is correct.

The phone number for Neon Software, maker of RouterCheck (Bridges, November '91, page 183) should be (510) 283-9771.

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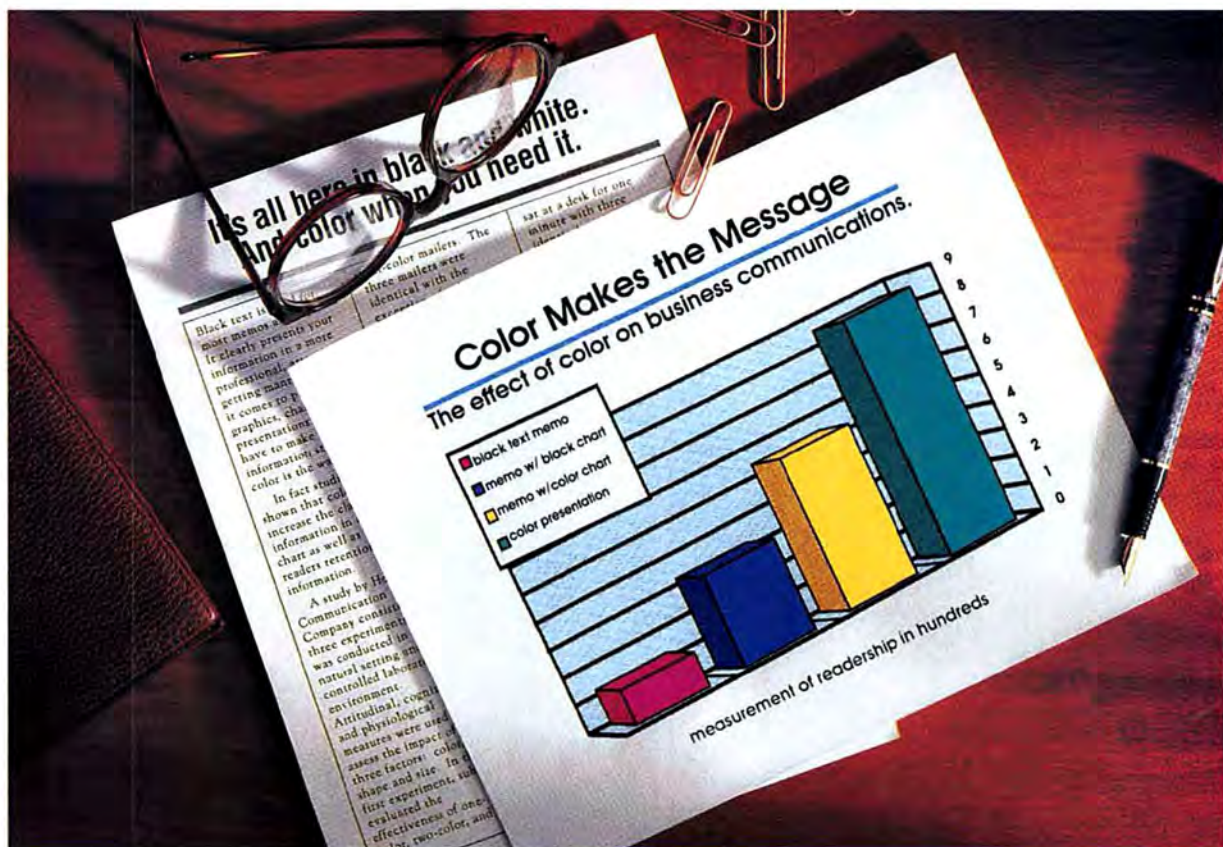
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Halfway to the Future



Apple's reinvented itself again, and the results will change the way you buy and use a Mac.

The Mac turns eight years old this month. With this bronze anniversary, Apple hopes to create a whole new golden age of computing. The direction in which the Mac is headed bears little resemblance to where it's been. But before we get to the road map of where the Mac will go in 1992 (and beyond), here's a refresher on how and why the events of 1991 sent the Mac spinning off in a completely new direction.

The Bronze Age

For the past eight years, there has been one overwhelming benefit conferred exclusively on Mac owners: the best-designed and most seamless, consistent, and intuitive graphical user interface.

Apple faced a dilemma, however. If the company allowed clone makers to license the Mac operating system, as had been done with MS-DOS in the PC universe, hardware prices would fall and the market share for computers running the Mac OS would rise but Apple's piece of that pie — and Apple's ability to extort premium prices in that market — would drop. And if Apple continued to keep the Mac OS to itself, its market share would continue to fall and the Mac's viability in the marketplace would dwindle.

Apple's solution was to roll out the Mac Classic, a low-end machine designed to get customers into a dealer showroom, where Apple's savvy authorized dealers would sell them on the benefits of buying a Mac IIx or an LC instead. Apple didn't count on the price-sensitivity of its customers, who insisted they wanted a Classic after all.

That set off the following chain of events: (1) Apple couldn't satisfy the demand for the Classic, frustrating customers and dealers alike. (2) Apple made almost no money on the Classic — one rumor has it that Apple spent an average of \$750 per CPU on marketing costs alone, an absurd amount when your flagship product lists for only \$999. (3) The Classic proved to be a painfully inadequate machine for System 7.

Publicly, Apple interpreted this turn of events as a resounding success.

Privately, Apple started making a few changes.

It may never have bothered Apple that its dealers didn't know anything about computer technology or after-sale support, but when it turned out that the dealers didn't even know how to perform a simple old-fashioned bait and switch, Apple apparently decided that it was

finally time to make some changes in the dealer channel.

Apple lowered the margins dealers made for simply taking your order and telling you how long you'd have to wait for delivery. Apple started moving into the lower-overhead direct channels of superstore distribution.

And Apple started looking around for new partners. It found one: IBM.

Apple needed IBM's clout, its sales presence, its customer lists, and its commitment as a partner against the Microsoft juggernaut. In exchange, IBM needed only two things from Apple: its past and its future.

Apple's past — the familiar desktop interface and consistency of operation — wouldn't be that hard to replicate. What IBM really needed was the rights to use that interface without fear of both companies going down in a torrent of lawyers.

Apple's future — the so-called Pink operating system, with its object-oriented programming orientation — was another matter. Here, IBM didn't need just concepts or rights — it needed the supposed one million lines of tested code already written for Pink. IBM needed to beat Microsoft to the punch with a next-generation operating system.

So Apple agreed to let IBM use the Mac look and feel in future PCs running an operating system based on Apple's Pink. In addition to the clout and validation Apple derives from its association with IBM (along with, Apple hopes, a Macintosh sale or two from IBM's enterprise-systems sales force), Apple also gets access to IBM's RISC-chip technology.

Inside the Taligentsia

Apple and IBM have formed a joint venture called Taligent to develop the new Pink-derived operating system. Each of the two parent companies will license the technology from the joint venture and will make and market competing desktop computers.

And it may happen sooner than you think. One of the beauties of object-oriented software such as Pink is that it's, well, object-oriented. Which means that pieces of it can work just fine even if you don't have all the pieces yet. So in contrast to its situation with, say, the long and winding road to System 7, Apple won't be faced with the compromise between cutting features and getting to market. Taligent can simply release pieces as each one is finished.

We'll have to wait to see who got the better deal. But what's absolutely clear is that this

deal has already irreversibly shifted the playing field. Apple can no longer proclaim, "We're the guys with the intuitive interface." IBM can no longer shout, "We're the outdated but safe choice." And Microsoft can no longer chime in from the

sidelines, "It's OK; we're with the band."

The bottom line is that — after years of diligent and litigious protectionism — Apple has all but given the crown jewels — the once and future Mac operating systems — to the public domain.

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Printer	Type	Grappier	Notes	Printer	Type	Grappier	Notes	Printer	Type	Grappier	Notes
Alps				Fujitsu				Printek			
ALQ200 Series	24 Pin	Grappier LX	6	DL2400	24 Pin	Grappier LX/LXLS	6	930dix	9 Pin	Grappier 9 Pin	1
ALQ300 Series	24 Pin	Grappier LX	6	DL2600	24 Pin	None		2000TX, 2000CX	9 Pin	Grappier 9 Pin	1
Allegro	24 Pin	Grappier LX	6	DL3000 Series	24 Pin	None		Ricoh			
ASP 1000	9 Pin	Grappier 9 Pin	1	DL4400	24 Pin	Grappier LX	6	PC6000	Laser	Grappier LX/LXLS	
P2000+, 2100	18 Pin	Grappier 9 Pin	1	DL5600	24 Pin	None		Seiko			
P2400	18 Pin	Grappier 9 Pin	1	DLX2100, 2200	9 Pin	Grappier 9 Pin	1	BP-5420	9 Pin	Grappier 9 Pin	1
AT&T				DLX2300, 2400	9 Pin	Grappier 9 Pin	1	MP-1300AI	9 Pin	Grappier 9 Pin	1
AT&T 450	Daisy	None		RX7300	Laser	Grappier LX/LXLS	9	SK 3000AI	9 Pin	Grappier 9 Pin	1
470 Series	9 Pin	Grappier 9 Pin	5	Genicom				SK 3005AI	9 Pin	Grappier 9 Pin	1
495	Laser	Grappier LX/LXLS	9	1025	9 Pin	Grappier 9 Pin	1	SK 3500+	9 Pin	Grappier 9 Pin	1
570, 571	9 Pin	Grappier 9 Pin	1	5010	Laser	Grappier LX/LXLS	9	SL 80AI, 130AI	24 Pin	Grappier LX	6
Blaser				Hewlett Packard				SP 180, 185AI	9 Pin	Grappier 9 Pin	1
Star 2	Laser	Grappier LX/LXLS	9	DeskJet	Inkjet	Grappier LX/LXLS	9	SP1200	9 Pin	Grappier 9 Pin	1
Brother				DeskJet Plus	Inkjet	Grappier LX/LXLS	9	SP 2000+	9 Pin	Grappier 9 Pin	1
1109	9 Pin	Grappier 9 Pin	2, 11	LaserJet	Laser	None		SP 1000AP	9 Pin	Grappier 9 Pin	1
1209, 1509, 1709	9 Pin	Grappier 9 Pin	1	LaserJet II, IIP, IID, laser	Grappier LX/LXLS			Sharp			
M-1909, M-1809	9 Pin	Grappier 9 Pin	1	LaserJet III	Laser	Grappier LX/LXLS		JX-720	None		
1724	24 Pin	Grappier LX	6	PaintJet	Inkjet	None		JX-6900	Laser	Grappier LX/LXLS	9
HL-8	Laser	Grappier LX	9	TrinJet	Inkjet	None		Star Micronics			
HL Series	Daisy	None		IBM				Gemini 10X	9 Pin	Grappier 9 Pin	
M-2518, 4018	18 Pin	Grappier 9 Pin	1	ProPrinter	9 Pin	Grappier 9 Pin	1	NB-15	24 Pin	Grappier LX	6
TrinWriter	9 Pin	Grappier 9 Pin	1	QuietWriter	None			NB25-10	24 Pin	Grappier LX	6
Canon				Kyocera				NB24-10, 24-15	24 Pin	Grappier LX	6
BubbleJet 10e	Inkjet	Grappier LX		F-1000A, F-1010	Laser	Grappier LX/LXLS	9	NP-10	9 Pin	Grappier 9 Pin	
A 60	None			F-2010, F-3010	Laser	Grappier LX/LXLS	9	NX-15	9 Pin	Grappier 9 Pin	1
CIE America				Laser Computer				NX-10, 100	9 Pin	Grappier 9 Pin	1
LifeWriter	9 Pin	Grappier 9 Pin	1	190E, 190A	9 Pin	Grappier 9 Pin	1	NX-1000, 1020	9 Pin	Grappier 9 Pin	1
Centronics				Manhattan Tally				NX2400	24 Pin	Grappier LX	6
PS210, PS220	9 Pin	Grappier 9 Pin	1	MT85, M86	9 Pin	Grappier 9 Pin	1	SD10	9 Pin	Grappier 9 Pin	
Citih				MT87, M88	9 Pin	Grappier 9 Pin	1	SG & SR	9 Pin	Grappier 9 Pin	
1550S+NLQ	9 Pin	None		MT165	9 Pin	None		Toshiba			
C-210, C-215	9 Pin	Grappier 9 Pin	1	MT290, M460	9 Pin	Grappier 9 Pin	1	P321	24 Pin	Grappier LX	12, 13
C-310, C-315	9 Pin	Grappier 9 Pin	1	MT330	24 Pin	Grappier LX	6	P321BL	24 Pin	Grappier LX	13
C-715	24 Pin	Grappier LX	7	MT610	Laser	Grappier LX/LXLS	9	P351C, P351SX	24 Pin	Grappier LX	13
C-815	24 Pin	Grappier LX	8	MT-SP80	9 Pin	Grappier 9 Pin	1	P351L	24 Pin	Grappier LX/LXLS	9
CI-2500	9 Pin	Grappier 9 Pin	5	Nishio				Key to Notes:			
CI-4000	9 Pin	Grappier 9 Pin	1	NP2410	24 Pin	Grappier LX	6	1. Epson EX, FX, JX series emulation			
D10-40, F10-55	Daisy	None		NEC				2. Epson LX series emulation			
Jet-Setter	Laser	Grappier LX/LXLS	9	LC650	Laser	Grappier LX	9	3. Epson RX series emulation			
Lips 10+	Laser	Grappier LX/LXLS	9	PX1L, P6, P7	24 Pin	Grappier LX	6	4. Epson MX series emulation			
ProWtr Jr.	9 Pin	Grappier 9 Pin	1	PX1L, P2200	24 Pin	Grappier LX	6	5. IBM ProPrinter emulation			
BS10	9 Pin	Grappier 9 Pin	1	P5200, P5300	24 Pin	Grappier LX	6	6. Epson LQ series emulation			
Citizen				PC6023, A	9 Pin	Grappier 9 Pin	1	7. Plug in cards emulate LQ-1000			
120-D, 180-D	9 Pin	Grappier 9 Pin	4	Oki				8. Toshiba P351 emulation			
124, 224	24 Pin	Grappier LX	7	80, 90 Series	9 Pin	None		9. HP LaserJet Plus emulation			
CSK-140	24 Pin	Grappier LX		2410 Series	9 Pin	None		10. HP compatibility option required			
CSK-200	9 Pin	Grappier 9 Pin	1	KXP-1080 Series	9 Pin	Grappier 9 Pin	1	11. No reverse line feed			
MSP-10, 15E	9 Pin	Grappier 9 Pin	1	KXP-1090 Series	9 Pin	Grappier 9 Pin	1	12. Parallel extension needed			
MSP-50	9 Pin	Grappier 9 Pin	1	LaserLine 6	Laser	None		13. Slow printing / not recommended			
Data Products				ML-180	9 Pin	None		NOTE:			
9030, 9040	9 Pin	Grappier 9 Pin	1	ML-192, 192+	9 Pin	Grappier 9 Pin	1	This chart represents the best current information			
9034, 9044	24 Pin	Grappier LX	6	ML-193+	9 Pin	Grappier 9 Pin	1	based on testing and data supplied by the printer			
DCS-Fonta				ML-292, 293	9 Pin	Grappier 9 Pin	1	manufacturers. Printers listed as compatible may still			
DM-2215, 1310	9 Pin	Grappier 9 Pin	1	ML-393+	24 Pin	Grappier LX	6	exhibit variations in multiple page alignment, slower			
Diconix				400 & 600	Laser	Grappier LX/LXLS	9	print speeds and other minor limitations. Laser printers			
150	12 Pin	None		240	24 Pin	Grappier LX		require a minimum of 1MB of printer RAM			
300W	9 Pin	Grappier 9 Pin	1	Olivetti Office USA							
Epson				DM 1005	9 Pin	Grappier 9 Pin	1				
FX Series	9 Pin	Grappier 9 Pin	1	Olympia							
FX-80, 85+	9 Pin	Grappier 9 Pin	1	LaserStart	Laser	Grappier LX/LXLS	9				
FX-86E, FX-185	9 Pin	Grappier 9 Pin	3, 11	NP30	9 Pin	None	1				
FX-100, FX-100+	9 Pin	Grappier 9 Pin	1	NP80S	9 Pin	Grappier 9 Pin	1				
FX-286	9 Pin	Grappier 9 Pin	3, 11	NP136S	9 Pin	Grappier 9 Pin	1				
FX-286E	9 Pin	Grappier 9 Pin	3, 11	PCPI							
JX Series	9 Pin	Grappier 9 Pin	1	Laring 1000	Laser	Grappier LX/LXLS	9				
QD0500	24 Pin	Grappier LX/LXLS	9	2000, 3000	Laser	Grappier LX/LXLS	9				
Logos				Panasonic							
LO800, LO850	24 Pin	Grappier LX		1080, 1091	9 Pin	Grappier 9 Pin	3, 11				
LQ1000, LQ1050	24 Pin	Grappier LX		1081, 1081i	9 Pin	Grappier 9 Pin					
LQ2400, LQ2500	24 Pin	Grappier LX		1090	9 Pin	Grappier 9 Pin	4, 11				
LX800, MX 80	9 Pin	Grappier 9 Pin	11	1092i	9 Pin	Grappier 9 Pin	1				
DPX-5000	9 Pin	Grappier 9 Pin	13	1124, 1524	24 Pin	Grappier LX	6, 11, 13				
DPX-8000	9 Pin	Grappier 9 Pin	13	1592, 1595, 1695	9 Pin	Grappier 9 Pin	1				
FLP7000	Laser	Grappier LX/LXLS	9	4420	Laser	Grappier LX/LXLS	9				
Facit				4450, 4455	Laser	Grappier LX/LXLS	9				
4509	9 Pin	Grappier 9 Pin	3, 11								
4510, 4511	9 Pin	Grappier 9 Pin	1								
4513, 4514	9 Pin	Grappier 9 Pin	1								
B1100, B3100	9 Pin	Grappier 9 Pin	1								
B3150	9 Pin	Grappier 9 Pin	1								
B3450	24 Pin	Grappier LX	6								
C5500	9 Pin	Grappier 9 Pin	1								
C6510, C6520	9 Pin	Grappier 9 Pin	1								
C7400, C7500	9 Pin	Grappier 9 Pin	1								
P7080A	Laser	Grappier LX/LXLS	9								



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The New Battlegrounds

So what will Apple do to differentiate the Macintosh? Here are five areas to watch:

1. Modular software. Software will get smaller, more specialized, and less expensive, thanks to the architecture and features of System 7. A steady stream of System 7-inspired applications and upgrades should finally start hitting the market at about the time you read this.

2. New application categories. As applications get more focused, they become easier for developers to create. That means that software publishers can be more entrepreneurial and take bigger gambles. More risks means more big payoffs in new areas (as well as more major-league turkeys). Watch for at least one major new application category in the field of data visualization to arrive in 1992.

3. Input devices. The mouse first hit the limelight eight years ago. Nearly every other aspect of computer technology has been revamped, revised, and reinvigorated through several generations of new technology, but the mouse is stuck in adolescence. Watch for new shapes and sizes of mice, including cordless mice that can transmit three-dimensional motion, as well as devices for voice, handwriting, and pen-based gestures.

4. Storage devices. Floppies, long overdue for a major change, will give way to *opticals* — discs the same size as floppies that combine floppy and optical technology to achieve 20 (or more) megabytes of storage — later this year.

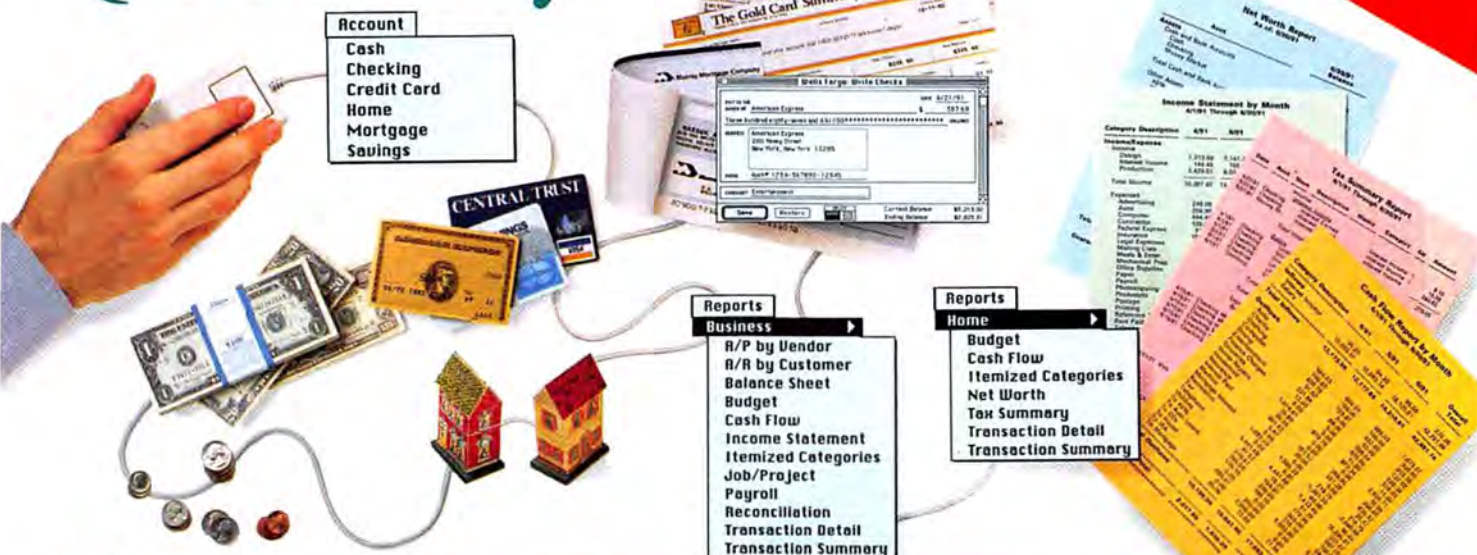
The hard drive on your desk will give way to a 3.5-inch erasable-optical-disc drive that holds 128 megabytes on each disc. They'll be widespread by year's end, with 256-megabyte versions driving prices down.

5. UNIX. UNIX? Yes, UNIX. New versions of Apple's homegrown A/UX (this year) as well as the first versions of the PowerOpen platform that will run IBM's AIX, the traditional Mac operating system, and A/UX (by the end of 1993, with luck) will keep corporate users going until the Pink revolution (1994). The reason UNIX is hot is that Apple is committed to supporting all these operating systems. That means that you can continue to invest in both commercial and custom software for any of these OSs, knowing that you'll be covered under PowerOpen.

The road map to the future is complex but clear. Now let's hope that Apple has finally learned how to drive.

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And the sharp corners all around.



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SONY

Backup. For people who don't.



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In fact, if the people you work with are like those working in most places we know, about the only way their data is going to get backed up is if it happens without them.

Guess what?

Now it can.

Now you can set up fully automatic, unattended backups for every Mac in the house.

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The Macintosh version of the world's most popular backup software is also the Mac world's most flexible backup software.

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Using Fastback Plus for Macs is very much like using Fastback Plus for PCs—same look, same functionality.

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That's right. You can actually restore a Mac file directly onto a PC, and vice versa.

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FIFTH GENERATION SYSTEMS, INC

CIRCLE 102 ON READER SERVICE CARD.

Anything Is Possible



Guess what?

The power of Macintosh isn't in a silicon chip from Motorola any more than the music is in a piano.

The house is an hour north of the Golden Gate Bridge in a town called Santa Rosa. It is the kind of place that only your parents would like: a quaint downtown with little restaurants and antique shops. It's not a real city, because it doesn't have a Fry's Electronics or a Price Club or a ComputerWare. Most people would stop there only if they needed gas. You wouldn't go to Santa Rosa.

The house is 750 square feet. It has two bedrooms, two closets, no garage, and no backyard. It's rented. Four people live in it: mother, daughter (age 5), and two sons (ages 9 and 13). She is a single parent, and people often ask her if being a single mother of three is difficult. She replies, "Yes, but it's easier than being married and a single mother of four."

She supports her family primarily by writing books about Macintosh. When the kids are asleep, she steals a chair from the kitchen and takes it to her workroom — which is also her bedroom. Her Macintosh is on the left side of the bed. Her scanner is on top of her sewing machine. Her mousepad is on the bed, because there isn't enough space next to her Macintosh. Hermann Miller would have a coronary in this work space.

The bed is high off the floor, and she built it herself. She built it high — three feet, to be precise — so that her LaserWriter could fit underneath. Space in her house is at a premium. When she works, she can't spread too many things out on her bed, because it would disturb her daughter, who is sleeping on the far side. Her daughter is sleeping there because she outgrew the old bed that was under the desk in the boys' room.

Beware: T Square

She was teaching typography and design at Santa Rosa Junior College when Apple introduced Macintosh. She and her T square and rubber cement resisted computers until one of her students brought over his Macintosh and left it on her kitchen table for a week. She connected with it quickly. She borrowed a Macintosh from the college for the summer. Later she took out a loan to buy an SE.

She quit teaching typography and started teaching HyperCard and Microsoft Works classes for the business department. The college let her work only part-time, so she had to hold several part-time jobs. One was designing box covers for hard-core-porn flicks. (She insists that she took this job to learn the four-

color-printing process.) Mainly, though, she taught Macintosh classes, and her class handouts grew into a little book. People from other classes asked for it. The county wanted to buy a dozen for its employees.

A small publisher in Oregon gave her a contract to write a HyperCard book. This was the deal she got: no advance and 11-percent royalties for camera-ready art. (Most authors get 15-percent royalties and provide only text.) While the publisher was reading two early chapters, she finished her little book about Macintosh basics. Later she realized that her publisher wasn't doing enough for her, so she studied how to self-publish a book.

When her father died, he left her mother some money. She borrowed \$15,000 from her mother and started a company to publish her books. She finished her books on her SE and printed 5,000 copies of *Macintosh Basics: An informal guide to using the Macintosh* and 2,000 copies of *The Mac is not a typewriter: A style manual for creating professional-level type on your Macintosh*.

Berkeley Marketing User Group

She forced herself to go to the BMUG booth at the 1989 Seybold Conference. She met Robert Lettieri of BMUG and told him that she'd like BMUG to look at the books. His reply was, "Great! We love to read Macintosh books. We rip 'em to shreds. We haven't found a book we like yet. Arthur Naiman tried to give us 30 copies of *The Macintosh Bible*, and we told him to take them back."

With trepidation, she gave him a copy of each book. The next day, Harry Critchfield from BMUG called and told her that he loved them. When she hung up, she cried. A few weeks later, Jerry Whiting reviewed *The Mac is not a typewriter* in *Aldus Magazine* and told people to buy it. The magazine didn't list a phone number for her, and her company wasn't listed in the phone directory, because she couldn't afford a business line.

The books started selling. She went back to BMUG and, after the meeting, had dinner with the core group. They gave her ideas about how to market her books. Scott Kronick gave her the name and address of Arthur Naiman. She wrote to him. She never heard from him. (I contacted Naiman's office about publishing *The Macintosh Way*, and his secretary told me that "Mr. Naiman only publishes his own books." Funny how the world works . . .)

Kronick also gave a BMUG member named

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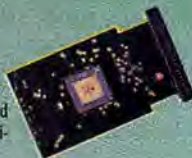
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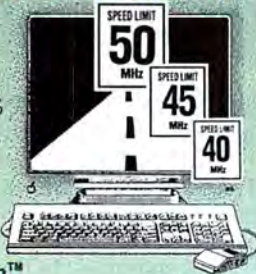
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GUY KAWASAKI

Kimn Neilson copies of the books, and Kimn offered to show the books to Peachpit Press. Twenty-four hours after he got them, Ted Nace, the president of Peachpit Press, called and offered to publish *Macintosh Basics*. After some convincing, he also acquired *The Mac is not a typewriter*.

The rest, to use a cliché, is history. *Macintosh Basics* became *The Little Mac Book*. *The Mac is not a typewriter* remained *The Mac is not a typewriter*. They've each sold more than 50,000 copies. The author is Robin Williams, and she's now applying for a loan to buy a house for herself and her three kids after years of making \$9,000 to \$12,000 annually.

Happily Ever After

The End. Happily ever after, right? Wrong.

Nine months after Peachpit Press, one of the littles book publishers, published *The Little Mac Book*, Que Corp., one of the biggest book publishers, published a book called *The Little Mac Book*.

Did Que intentionally and maliciously steal the idea? No. Que had already published a book called *The Big Mac Book*, and its *The Little Mac Book* was to be a complementary volume. Que's rationale was probably this: Because we didn't steal the name and we had plans to do one before Robin's book appeared, we can go ahead with a book of the same name.

Could Peachpit sue Que? Maybe. Book titles are not copyrightable, but there are issues of unfair competition here. It doesn't really matter, though, because the cost and hassle of litigation eliminate the *practicality* of legal actions. Still, people are going into bookstores to buy Robin's *The Little Mac Book*, and they're getting Que's *The Little Mac Book*.

This bothers Robin a great deal. She wrote a letter to Que but never sent it. Here's a paragraph from it:

"There is nothing I can do about your undermining the sales of my book. There is nothing I can do about your riding on the wave of my book's popularity. There is nothing I can do about the people who read the reviews and think they are buying my book and get yours instead. There is nothing I can do about the fact that you will seriously affect my livelihood that I have struggled so hard to create. There is nothing I can do except tell you that I don't think you are very nice. It won't change anything, and it doesn't even really make me feel any better, but I have to say it. You are not very nice."

Go to your bookstores and tell them this story and make sure that they sell the right *The Little Mac Book*.

Robin is wrong. There is always something you can do. You could, for example, tell me. I, in turn, will tell the more than 300,000 readers of *MacUser*. Then we can make Robin's Little Macintosh Problem into a cause and show a big company that we Macintosh crazies are a potent force. We can show them that they should do the right thing the right way and rename their *The Little Mac Book*.

Name That Book

I spoke to Que's publisher, Lloyd Short. He seemed like a reasonable person. Actually, I wish I could tell you that he wasn't, so that I could unleash the wrath of Macintosh on him. I just think that he needs to be *motivated* — if you catch my drift.

This is what I want you to do: Send him a fax at (317) 573-2583 or a letter to 11711 N. College Avenue, Carmel, IN 46032. In your fax or letter, insist that this situation be corrected and then give him your suggestion for a new name for his book. Also, go to your bookstores and tell them this story and make sure that they sell the right *The Little Mac Book*. Poor Lloyd — I hope he has a lot of fax paper.

Don't read this as a purely negative story. Take delight in the fact that an unemployed single mother of three on welfare pursued her dream of writing and publishing cool Macintosh books, that she ultimately achieved success and popularity, and that she helped tens of thousands of people use their Macintoshes better.

And that at the height of her success, she was "wronged" by a company and that the Macintosh community rose to the challenge, defended her, and made things right.

One more thing: If you ever get a letter from an unknown single mother of three on welfare who wants you to publish her book, you should respond. In the Macintosh world, anything is possible.

(P.S. In all fairness, you should know that one of Robin's part-time jobs was doing layout for After Hours, a software company I have an interest in, and that Peachpit Press also publishes a book I wrote.)

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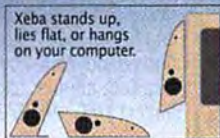
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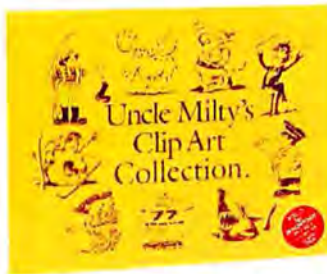
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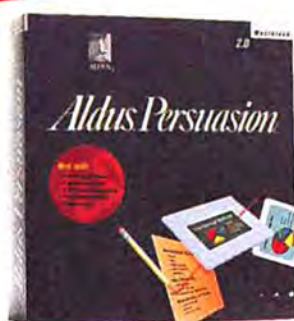


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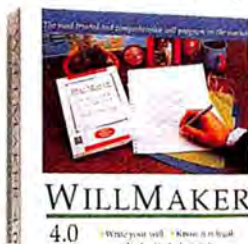
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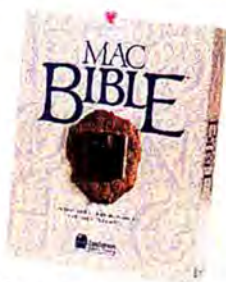
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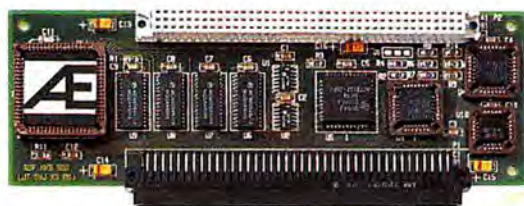
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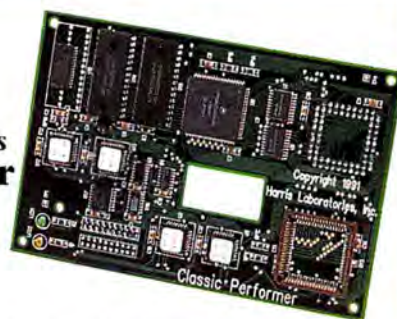
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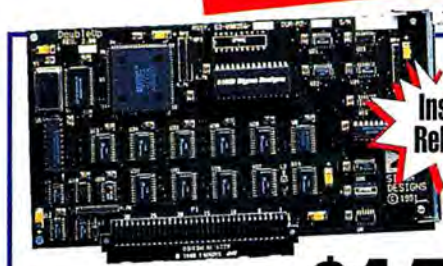
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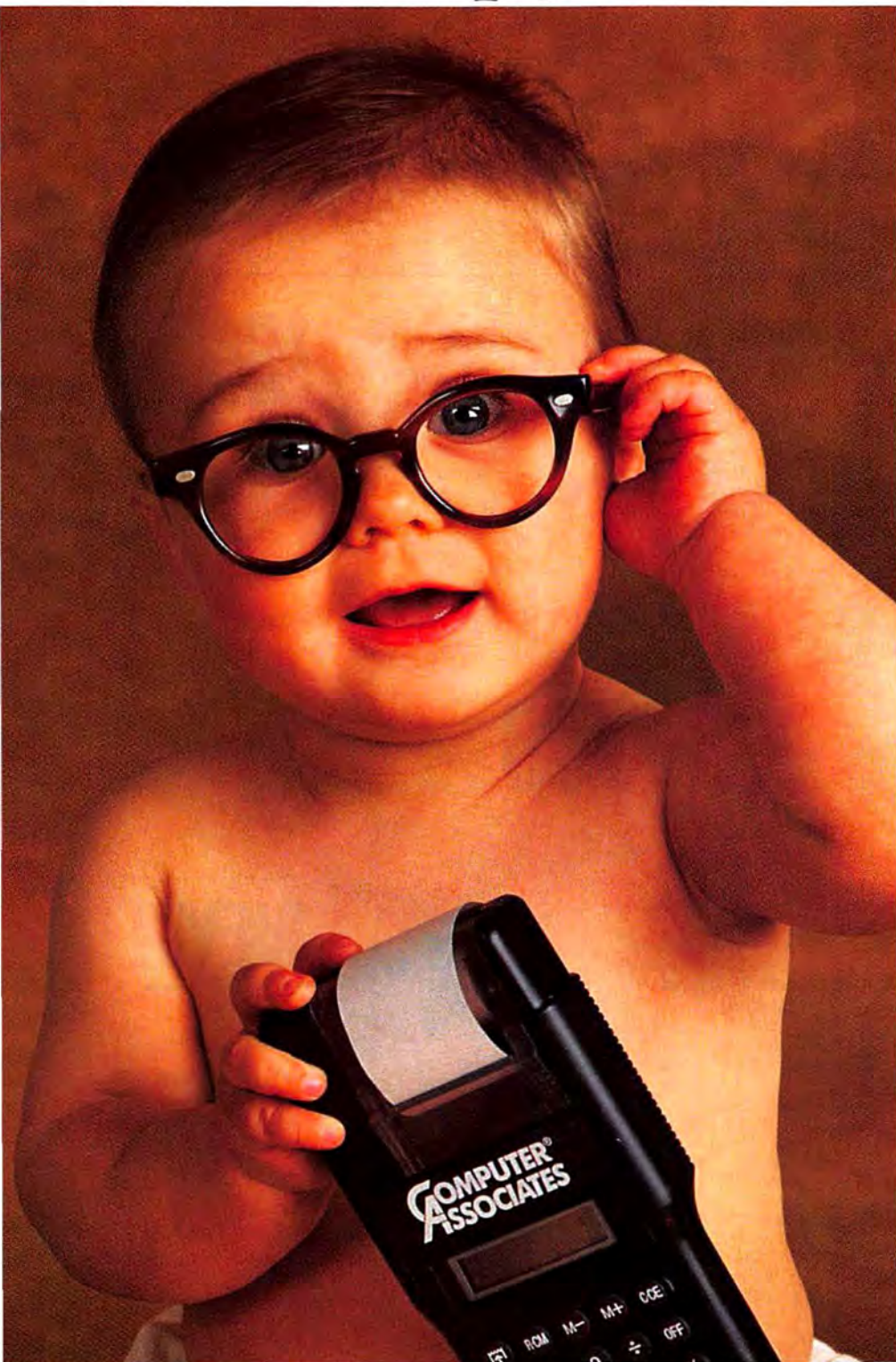
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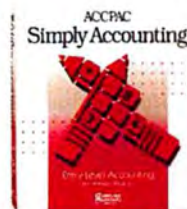
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I have a problem with the word *productivity*. OK, I have a problem with productivity, which I'll get to later, but let's start with the word itself.

To me, the word *productivity* has something of the tone of bleak science-fiction movies in which mindless workers slave away like interchangeable cogs in some giant industrial machine while the big boss shouts for more productivity, more productivity. So it rings slightly discordantly when I hear people say that they want to be more productive, but that's what a lot of you say. I say it myself. It's why I bought a computer.

I can think of two interpretations of our desire to be more productive. One interpretation is that we are dronelike yuppie workaholics, and the other is that we want to leave early. I prefer the latter. I have encoded it in an equation mantra.

Equation mantras are something I picked up from Dave Winer, president of Userland Software, who works through any bad karma over competitive and cooperative relationships between Apple and third-party-software companies by chanting, "Claris equals Apple. Claris equals Apple. Claris equals Apple." It keeps it all in perspective for him. My equation mantra is a simple but effective one: "Productivity equals leaving early."

Given that we want to be more productive, how do we go about it? I suggest that being more productive is chiefly a problem in perception. If you see that one piece of software or one way of working is more productive than another, you have solved the problem. The seeing is the trick, because there are several kinds of blinders that can prevent you from seeing opportunities for increasing your own productivity.

When Smart People Do Dumb Things

First, it's hard to see the forest from inside the tree.

What I mean by this sappy metaphor is that while we are performing a task, our thoughts are focused inside the task space, which makes it more difficult to assess the effectiveness of our performance.

Michael Abrash, in an interesting essay in the October/November issue of *PC Technix*, which was chiefly devoted to a review of the ergonomics of musical toilet-paper holders (a subject that we can only assume has some particular appeal to users of PC computers), describes a form of blindness to the effects of

technology. Abrash observed this blindness in himself when he found that he was firing up his computer to address a single envelope and finishing the job in the time it took his wife to address a dozen or so by hand.

You may contend that this is no more than you would expect from a PC user, but I know from independent sources that Abrash is no fool. No one needs to tell him that it's just plain dumb to fire up the computer to address one envelope if a handwritten address will do as well. Yet he did it, and he wrote about it — perhaps an even dumber act, but one that illustrates for us the first kind of productivity blindness. You can't see the forest from under the bark.

The cure for this kind of blindness is absurdly simple. Get out of your tree. Wake up and smell the coffee. Better yet, stand up and get some coffee. A brief break from the task is often all you need to get some perspective on your own productivity in that task. What's important is to step outside the task to give yourself the chance to ask an obvious question such as "Wouldn't it be faster for me to do this by hand?"

Ware and Tare

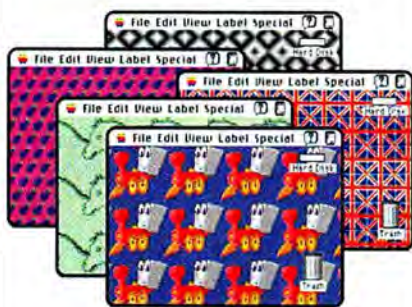
Unfortunately, getting perspective on a task doesn't help when you come up against a productivity problem that has nothing to do with the task. And asking yourself if you couldn't perform this task faster by hand doesn't work if the task is nothing you would ever do by hand, such as aliasing your apps or running the Compatibility Checker. I don't know about you, but it's been a long time since my work piled up so high that I had to bring out the hammer and nails and rebuild my *physical* desktop. Rebuilding my *Macintosh* desktop, though, is something I do for my Mac when it tells me it needs it done.

The point is that there are some tasks you need to perform just because you have a computer and that, consequently, some software — the Macintosh operating system and the Finder, for example — is written to support the computer rather than to support you directly in performing your tasks.

You might think of the distinction as ware and tare. There's ordinary application software, designed to aid in performing tasks, and there's the tare, all that stuff in the package that isn't the real content but that contributes to its gross weight. Sometimes, as in the case of System 7, it bulks pretty heavy.



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This rare can increase or decrease your productivity, but you can't evaluate its contribution by examining your performance on a specific task. Instead, you need to look at its effect on your overall work flow. If you have enough memory, using System 7 will probably increase your productivity relative to System 6, but this is not an effect you can see easily by looking at one task.

When you focus on your work flow generally, you may discover subtle factors affecting your productivity. Long waits while the program accesses a remote database, updates an index, and so on, are surely counterproductive, right? Not if you've learned the Kafkaesque technique of scheduling coffee breaks around them. ("Leopards break into the temple and drink up the sacrificial wine. This is repeated over and over again and eventually is incorporated into the ceremony." — Kafka.)

Again, it's just a matter of getting some perspective, but when you're looking at your work flow, you need more distance. Don't just go to the coffee machine. Go for a walk.

Gerrymandering the Taskspace

Getting some broad perspective on your work habits is fine if you can assume that your work methods will continue as originally defined. But when a new paradigm gerrymanders your taskspace, even that broad perspective isn't broad enough.

Robert Carr, cofounder of GO Corp., which is developing a pen-based operating system, has done a lot of thinking about how people and computers work together. He says that mobile computing is a new paradigm. It will, he says, change the way in which we interact with the computer. No longer will we have to think of going to work as *going to* work. No longer will we let the machine dictate to us our location or our posture when we work. Depending on the necessary level of concentration, some work might well be done while we're stretched out on the couch, watching television. Just like we did it before we had computers.

I don't doubt that Carr is right, although I'd like to see the productivity impact statement. Working at home as I do, I suspect that the act of going into my home office and sitting down at the computer may just be the slender thread by which the tattered garment of my productivity hangs.

The point here is that when a product or

Some work might well be done while we're stretched out on the couch, watching television. Just like we did it before we had computers.

technology changes the rules of the game, redistricts task borders, gerrymanders the taskspace, we need to look beyond the individual task and even beyond any broad perspective on our work habits. New paradigms can eliminate the need for some tasks, call for new subgoals. We need to ask goal questions such as what am I trying to do on this project? in this job? with my life?

There's only one perspective from which to assess these kinds of things: outside the job. Take a vacation.

A Review and Another View

OK, let's review. If you want to be more productive and you share my definition of productivity, you should


- Take plenty of breaks.
- Go for frequent walks.
- Take as many vacations as possible.

This is a prescription that is guaranteed to improve your productivity. Tell your boss I said so.

If, on the other hand, I have misjudged you and your reason for wanting to be more productive is that you are indeed a dronelike yuppie workaholic, you will find the above advice worthless. Against that possibility, I offer the following dronelike-yuppie-workaholic advice:

Take charge of your computer work environment. Rather than analyzing your work, choreograph it. The key to this, user scripting, is just now becoming available on Macs. The promise of products such as Dave Winer's Frontier is that a sufficiently fanatical user can drive applications and the interaction among them and the operating system, forcing them all into the user's preferred way of working.

This is what dronelike-yuppie-workaholic PC users do.

This approach is guaranteed to increase your overall productivity, as long as you don't count the hours you spend writing and debugging scripts. *That* you have to do for the fun of it. 

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"Faster than new" speed and maximum performance of your Mac by intelligently monitoring your actual file usage and grouping frequently used files together plus defragments them	YES	NO	NO
Safely optimize any disk, regardless of the amount of fragmentation, without causing directory damage and lost data	YES	NO	YES
Clicking the program's STOP button always halts optimization safely without causing directory damage and lost data	YES	NO	YES
Verifies the accuracy of what it reads and writes during optimization by double-checking your data using technology that works on all hard disks—even those from Apple	YES	NO	NO
Adeptly optimizes any disk containing bad blocks spared by System 7, Norton Utilities, MacTools Deluxe or Sector Collector™ without the hassle of having to reformat your entire disk	YES	NO	NO
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CIRCLE 171 ON READER SERVICE CARD.



NEW ON THE MENU

The scanner vanishes: In our November issue, we told you about the CorrectScan 300, a color scanner that RasterOps was preparing in conjunction with its CorrectColor line of products. Well, you can keep your checkbook in your pocket. RasterOps has backed off and put the scanner on indefinite hold. The company says that it couldn't produce the scanner with the performance it wanted at the price it was planning to charge. The best-laid plans . . .

By Russell Ito

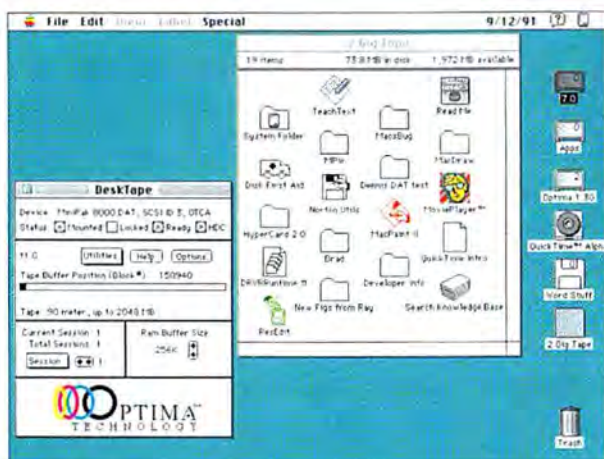


QuickTime time: Although you may not actually see Apple's QuickTime for another month, developers have already started producing QuickTime applications — applications you should be seeing in dealers' hands now. → Among the monitor manufacturers — which seem to be driving much of the video revolution — SuperMac Technology ([408] 245-2202) appears to have taken the lead in digital video. SuperMac's VideoSpigot video-digitizing cards were mentioned in our August '91 issue (see page 102), and since then, SuperMac has sold its video-editing software, ReelTime, to Adobe Systems. Although Adobe's Premiere (née ReelTime) will ship with the VideoSpigots for the first 90 days of their release, SuperMac will also include a new package, ScreenPlay. Based on SuperMac's early tests, ScreenPlay permits the real-time (no pun) recording and playback of composite video at rates of 15 frames per second on a IIx1 or about 30 frames per second on a Quadra 700. These rates apply to a window size of 160 x 120 pixels, the size used for most QuickTime Movies. The frame rate is slower for larger window sizes. ScreenPlay also includes an off-line compressor that can compress captured files at ratios as great as 20:1, once the capture has been written to disk. Finally, ScreenPlay lets you capture a single image from the live-video-preview window just by putting the cursor over the preview and dragging — no marquee is involved. → Meanwhile, Adobe Systems ([415] 961-4400) is selling Premiere as a stand-alone product (\$495). Premiere is a video-editing program that remains essentially the same as the one we first covered in August '91 (see page 102), although Adobe has expanded its capabilities. For example, you can now access any video frame directly, by typing the frame number, and video and audio can be inserted separately. Premiere can now read and write QuickTime Movies, additional effects have been added, and it has extensive support for Photoshop. → QuickTime may not be a part of your working life yet, but video on the Clipboard may be only a QuickTime away.



Up to Date . . .

Hewlett-Packard (Cupertino, California) has slashed the price of its DeskWriter from \$729 to \$599. (800) 752-0900. → **After Hours Software** has shipped TouchBASE 2.0, the enhanced version of its PIM. Improvements include System 7 support, additional phone fields, multiple-field sorting, and QuickDex and Dynodex conversion. (818) 780-2220. \$125. → **Microsoft** has updated The Microsoft Office CD-ROM to version 1.5. The new bundle includes Excel 3.0, Mail 3.0, Word 4.0, and PowerPoint 2.01. (206) 882-8080. \$750. →



A tape drive that's as fast as a hard drive and works like one too? Hard to believe, but that's exactly what Optima Technology has produced with its MiniPak line of DAT drives (below left) and DeskTape software (left).

Disk or DAT

Every now and then, we come across a technology that completely turns our conceptions of the world upside down. For example, imagine a tape drive that mounts on the desktop, is Finder-readable, and is as fast as a hard drive. Now imagine that you could use that tape just as you would any other volume: double-clicking to open files, dragging to copy them, and even ejecting the tape when the desktop icon is dragged to the Trash. That's exactly what Optima Technology has created with its DeskTape software and MiniPak 2000/8000DAT drives.

DeskTape is an extension that lets Optima's DAT drives function just like any other volume. For example, when you insert a new tape into the drive, you get a dialog box that looks very much like Apple's familiar "This disk is unrecognizable" dialog box.

Using the drive's built-in hardware compression, the MiniPaks can store up to

8 gigabytes on a tape, but the Finder limits DeskTape to 2 gigabytes. (If you want the full 8 gigs, you have to use Retrospect, which Optima includes in the package.) Because of the compression, however, DeskTape uses only a quarter of the tape for those 2 gigs, making file access a snap.

DeskTape needs 5 megabytes of contiguous boot-volume space for a temporary directory while the tape is mounted. When the tape is unmounted, DeskTape copies the temporary directory to the tape.

Because DeskTape writes its data to the tape sequentially, the tape cartridge acts most like a WORM disc. (We don't believe that Optima ever considered *Tape-WORM* as a product name.) Earlier versions of a file, for example, aren't replaced when a newer version is copied to the tape. Instead, the software writes a new copy of the file with a new directory, which makes it possible to go back to an earlier session to recover an old version of a file.

Optima plans to release DeskTape as a stand-alone software package, for use with any DAT drive, in the first quarter of 1992.

Optima Technology Corp., 17526 Von Karman, Irvine, CA 92714; (714) 476-0515. MiniPak 2000DAT, \$3,495; MiniPak 8000DAT, \$4,495; MacKit/DAT, \$195.



Speed Reader

The paperless office is still a myth, and in fact, most offices probably get more paper now than ever. If your office is being crushed under reams of incoming paper, Calera's high-end high-speed M-series OCR systems may be the answer.

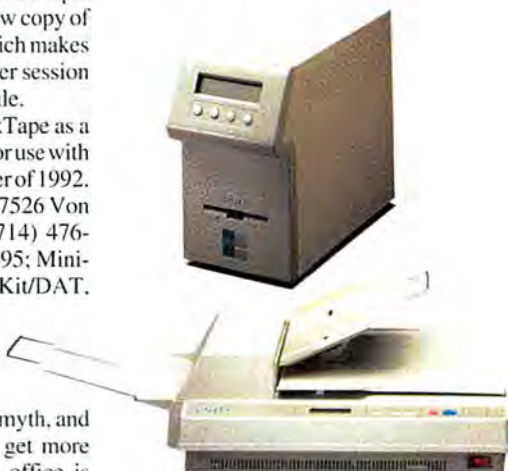
The MX2400 and MX600 include a high-speed scanner and a freestanding

SCSI processor box. Using four NuBus cards, each driven by an AMD 29000 RISC chip and packing 5 megabytes of RAM, the MX2400 can deliver reported recognition rates as great as 2,400 characters per second, or 28,000 words per minute. The MX600, which has only a single NuBus card, delivers rates of 600 cps, or 700 wpm. (The MX600 is fully upgradable to the MX2400.) What this translates to is an average total processing time, including scanning and recognition, of seven to ten seconds per letter-sized page. Calera's flatbed scanner, which includes an 80-page sheet feeder, can complete its scans in a little more than three seconds. For those who already have a scanner, the processor boxes are also available unbundled.

As with Calera's earlier high-end OCR systems, the M-series' software includes such features as deferred processing; multijob processing; style sheets; and AutoClipping, which automatically distinguishes text from graphics. In addition, the M-series processor boxes include a floppy-disk drive, so you can complete software and language updates just by downloading the new data to the system's EPROMs.

If your office is drowning under oceans of paper, the M-series systems can justify their hefty price tags in a matter of months.

Calera Recognition Systems, Inc., 475 Potrero Avenue, Sunnyvale, CA 94086; (408) 720-8300. MX2400, \$44,995; MX600, \$29,995.



Calera Recognition's M-series of high-end OCR systems combines a fast scanner with an AMD 29000 RISC-based OCR processor that can complete a full-page recognition job in five to seven seconds.



Radius' PrecisionColor Display/20 can sync to any video signal from 30 to 70 kilohertz and even switch resolutions without rebooting.


Radius' Intelligent Monitor

To misquote Professor Higgins, "Why can't a monitor be more like a man?" With the variety of video cards in circulation, a monitor that could think for itself and figure out the appropriate sync timings and resolution for optimal image display would be a boon. That's exactly what Radius has produced.

Radius' PrecisionColor Display/20 is a microprocessor-controlled 20-inch Trinitron display that can sync to any video frequency from 30 to 70 kilohertz and, with a Radius PrecisionColor interface card, can switch resolutions on the fly from 640 x 480 to 1,024 x 768 to 1,152 x 882 pixels — without a reboot.

The PrecisionColor Display/20 also gives users extensive control over the image's geometry, including height, width, and centering plus brightness, contrast, and convergence. Once the monitor has been configured as desired, those settings can be saved and then accessed through the monitor's software. The PrecisionColor Display/20 comes with 10 common configurations preset and offers memory space for 15 user-definable configurations. If the user has more than 15 settings, the 16th replaces the 1st.

Ergonomics also plays a part in the PrecisionColor Display/20. The monitor includes an integrated tilt/swivel base, has a bonded antiglare panel, and meets the Swedish government's guidelines for magnetic emissions. Even with all these features, the PrecisionColor Display/20 is aggressively priced.

Radius, Inc., 1710 Fortune Drive, San Jose, CA 95131; (800) 227-2795 or (408) 434-1010. \$3,299. 

NewsLine

Special Report

Apple and IBM: Together at Last

We've come a long way from the lemmings — Apple's 1985 Super Bowl ad for the Macintosh that portrayed IBM PC users as mindless automatons. Yesterday's desktop-computing world was divided into Big Red and Big Blue; tomorrow's has a distinctive purplish tinge. Apple and IBM signed five hefty technology agreements that, if they don't move the two companies closer to outright merger, certainly will put the fate of their respective desktop strategies into each other's hands. Here are some of the details:

Networking. Macs will be more tightly integrated into IBM's SNA networking strategy. OS/2 file servers will support AppleTalk connections. Apple will use IBM's 16-megabit token-ring chips for a new NuBus token-ring card that should appear about the time you read this. IBM's NetView network-management software will be modified to monitor AppleTalk networks. And IBM's APPN (Advanced Peer-to-Peer Networking) protocols will be implemented on the Mac, letting Macs serve as fully integrated front ends in distributed applications (programs that divide a task between an IBM mainframe and a Mac). Networking will probably be the first area to show any tangible results from desktop détente, and some products could appear by the time you read this. Products and solutions should also continue to appear throughout 1992 and 1993.

RISC. Apple, IBM, and Motorola will cooperate on the development of a line of PowerPC RISC processors, single-chip implementations of the POWER RISC-processor architecture IBM uses in its System/6000 workstations. Both Apple and IBM will sell computers based on the new chip, which will also be available to other computer vendors. Time frame: 1993 to 1994.

UNIX. Apple will port the Macintosh interface it developed for its own UNIX product, A/UX, to run on top of IBM's brand of UNIX, AIX. The new Mac-flavored UNIX operating system will be called PowerOpen (ugh) and will run on IBM's current POWER-architecture computers (such as the RS/6000) as well as future PowerPC-based machines. Apple and IBM will sell PowerOpen systems.

PowerOpen will also be licensed to other vendors and should begin appearing in 1993 to 1994, along with the PowerPC chips.

Multimedia. Kaleida (pronounced "col-lide-uh"), one of two new Apple/IBM joint-venture companies, will focus on multimedia. It will establish standards and license technologies that will enable users of a variety of different types of computers and operating systems to share multimedia information such as sound, animation, and video. Apple's QuickTime will undoubtedly form a strong basis for Kaleida's work. Time frame: It's anyone's guess.

Pink. A second joint venture, Taligent (hey, we didn't make up these names), will develop a new object-based operating system (OBS). Taligent's offering will be based on Pink (the code name for a three-year OBS-development project at Apple) and similar work from Patriot Partners (yet another IBM joint venture, this one with Metaphor, not Apple). The new OBS will run on Motorola 680x0, PowerPC, and Intel 80x86 processors. Apple and IBM will use the system on future computers, and Taligent will license it to other computer vendors as well. Portions

of the new system may also be incorporated into future versions of the Mac and PowerOpen operating systems. Taligent's OBS will support existing

Macintosh, OS/2, and AIX applications. Supporting DOS and Windows apps will probably be left as a "third-party opportunity."

Why all the fuss about object-based systems? They are easier to modify and customize than traditional operating systems. Taligent's new system is expected to reduce the time required for both system- and application-software development, but don't expect a product before 1994 or 1995.

So what? Predicting results from the Apple/IBM alliance amounts to guesswork. Macs will probably be integrated into SNA networks, but that was inevitable. Apple will adopt a Motorola-built PowerPC RISC chip, and Kaleida may yield some multimedia standards. But most importantly, Apple Computer is finally realizing that its strength has always been as a systems-software company.

— Henry Bortman




GRAPHICS & DESIGN

Canvas 3.0

Deneba Software's newly retooled Canvas is unsurpassed among QuickDraw drawing programs for precision and depth.

In the QuickDraw-graphics arena, not even MacDraw Pro's solid talents can match the features, accuracy, and depth of Canvas 3.0. This version of Deneba's jack-of-all-trades drawing program includes an impressive collection of new tools that invite serious comparison with high-end graphics-and-design programs. Noteworthy additions include powerful new alignment and measurement tools; improved text and type handling; new graphics features, such as gradient fills and plug-in tools; support for multiple graphics-file formats; and support for System 7's publish-and-subscribe.

Modular Design

With its plethora of tools and palettes, Canvas 3.0 risks a serious case of "featuritis." However, Deneba has immunized Canvas against the disease by taking a modular approach to the program's design. At installation, you can decide which of the program's many bells and whistles you want to introduce to your Mac by calling up the Tool Picker, which lets you specify which tools will be loaded at startup. In fact, you can define numerous tool sets to customize Canvas for specific tasks.

If you choose to install everything (which you may be sorely tempted to do), be prepared to devote almost 5 megabytes of disk space to Canvas. Deneba recommends a minimum of 2 megabytes of RAM to run the program.

In its ability to wring the utmost out of every pixel on-screen, Canvas is unsurpassed by any other graphics program. Although Deneba has eschewed the popular trend of placing all tools in floating palettes (as with previous versions, Canvas 3.0's tools are located at the left side of each window), clicking on almost any tool pops up a subsidiary palette that you can tear off. In fact, Canvas 3.0 has so many palettes that it's easy to completely obscure your drawing window, even if you're using a 19-inch monitor.

With its supremely customizable arrows and measurement features, Canvas has always been a popular tool for technical illustration and design layout. You can create technical drawings with even more precision and speed with version 3.0's Smart Mouse drawing aid and new dimensioning tool.

Canvas' Smart Mouse senses when the mouse is close to edges or center points of nearby objects or to vertical or horizontal

alignment. It then snaps the mouse to these locations automatically. The package provides a slew of constraints for Smart Mouse, and you can also define custom constraints and keep multiple constraints active simultaneously. Smart Mouse uses helpful icons and lines that show you which constraint type is affecting it at any given moment. Smart Mouse certainly lives up to its name — as you draw and arrange objects, they seem to know where you want them to go even before you do.

The dimensioning tool draws lines for objects and measures not only the length of straight lines and edges but also the radius and diameter of selected ellipses or degrees in an angle. You can customize the dimensioning formats, and the package includes a variety of industry-standard measuring systems. The dimensioning tool works spectacularly with Smart Mouse, making it a snap to draw shapes and align them with measurements. These dimensioning lines are "live" and change their numbers accordingly as you modify objects.

The parallel-lines tool provides options for drawing multiple parallel lines along a defined path, adding yet another powerful feature to Canvas' already impressive collection of custom arrows and dashed lines.

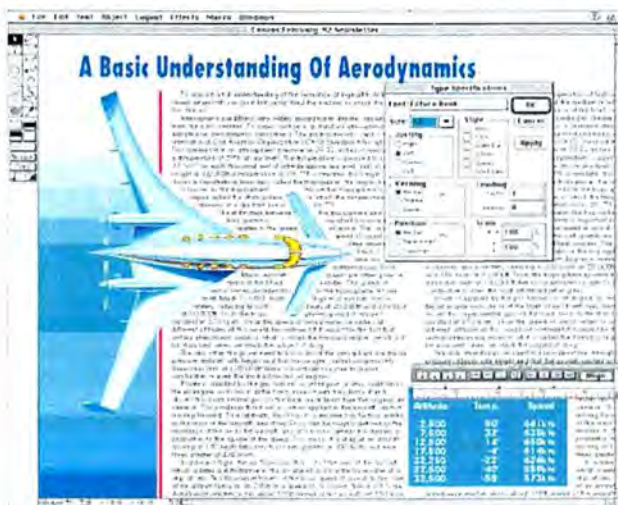
You can also define hatch patterns and apply them to any object. The program comes with several predefined patterns that use industry-standard symbols for materials such as glass and concrete.

Type Tricks

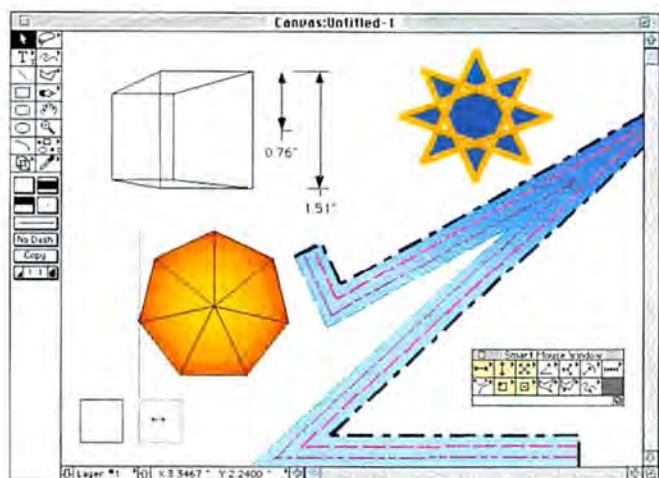
Canvas 3.0 has some new type tricks up its sleeve. This version lets you define slanted margins for text boxes and set text to run around or inside any object in your drawing. A floating MacWrite-like text ruler sets tabs, alignment, and leading. You can stretch type vertically and horizontally and kern and track it, but only in fractions of points, not in the more useful em units.

One small disappointment is that you can set tabs, leading, and alignment only for a text box as a whole. Canvas lacks the paragraph-level formatting that MacDraw Pro provides.

You can bind text to a path and wrap text inside or around any object. Canvas 3.0 can also convert Type 1 and True-Type fonts to editable Bézier outlines, so that you can apply and reapply the program's venerable 1- and 2-point



Canvas 3.0 is the most fully featured QuickDraw drawing package available. New text-handling features let you set text to run around or inside any object.



Canvas lets you create more-precise technical illustrations with its new Smart Mouse drawing aid and dimension tool.

perspective distortions to create some impressive type effects quickly and easily.

Canvas' Bézier drawing capabilities are greatly improved in this version, making them not only vastly superior to MacDraw Pro's Bezicons but also putting them on a par with those of Adobe's Illustrator or Aldus' FreeHand. Canvas allows you to mirror the editing of control points (moving toward or away from their anchor point simultaneously) or change the length of an anchor without changing its angle.

The Blend command creates multiple intermediate objects to make smooth transitions between two or more objects, and you can blend multiple objects in one fell swoop, a feature that not even high-end drawing programs provide.

Although Canvas can't quite match the masking and compound-object features of PostScript drawing programs, its Combine command comes close enough for most purposes. Combine converts multiple selected objects into a new object. A variety of options let you turn multiple shapes into a single outline, create new shapes based on how they intersect, remove areas that overlap, eliminate areas that *don't* overlap, or even slice off shapes at their intersection.

Gradient fills can be directional, radial, or based on the shape of the object you're filling. You can select only two colors for a blend (unless you get clever with redefining your picture's palette). In this regard, MacDraw Pro's blends, which use up to four colors, are superior.

If you've ever tried to draw a 22-point star by hand, you'll appreciate Canvas' object tools. The program lets you draw cubes, stars, grids, registration marks, and

polygons with great flexibility and precision. You won't find these invaluable tools available in MacDraw Pro or in *any* other drawing program, for that matter. These tools alone make Canvas 3.0 well worth its price.

Although Canvas can import, save, and edit 24-bit TIFF and PICT images as paint objects, its painting tools are only adequate for creating simple images or for lightly touching up more-complicated ones.

In addition to the 256-color palettes of earlier versions, version 3.0 supplies custom color libraries and ships with several libraries of Pantone colors. You can also define and save your own custom color libraries.

Be Selective

A handy new Selections command allows you to find all the objects in a drawing that match a particular combination of attributes, such as color, pattern, and line weight. You select attributes from a dialog box by using simple pop-up palettes. Unfortunately, you can't search for custom colors and searches for colors in text blocks aren't always reliable.

Canvas can import and export files in CGM, DXF, and IGES formats (for exchange with DOS and CAD programs) as well as in Illustrator 88 and Illustrator 1.1 formats. You can save files in Startup-Screen and EPS formats or as process separations in several formats, including the multifile Desktop Color Separation format. Canvas can also read, but not write, MacDraw I and II files. Overall, Canvas does an impressive job of retaining detail when it converts files to other formats, especially to EPS or Illustrator formats. As a result, Canvas is an excellent

complement to high-end drawing programs — you can use its unique tools to start drawings and then export them as Illustrator files to a more advanced PostScript program.

Canvas can print four-color process separations, although it has no spot-color option. You can also use Canvas' extensive layering support in conjunction with the program's Slide command to create on-screen slide-show presentations.

Canvas 3.0 is a System 7-savvy program that supports Balloon Help and publish-and-subscribe. Unfortunately, because of the way publish-and-subscribe is implemented in System 7, you can publish graphics only as PICTs, which means that you may lose some detail in your drawings (a hindrance that's no fault of Canvas). There's no way, at present, to embed PostScript into published PICTs, nor are any other tweaks available for producing better output.

The Bottom Line

When Deneba Software first shipped version 2.0 of Canvas, the software arrived in a very large box containing a medium-sized user guide, a cute and bulky miniature easel, and lots of foam padding. Version 3.0 also comes in a big heavy box, but this time, there's no filler. With all its features, Canvas demands the hefty documentation that takes up most of the room in the box.

As a midrange drawing tool, Canvas 3.0 is clearly superior to rival MacDraw Pro, and it even offers some features that aren't available in more-expensive professional-level packages. The list of Canvas' varied talents is long, but highlights of the new version are Smart Mouse and the dimensioning tool for technical illustration, new Bézier drawing tools, and the unique Object Tools palette. At \$399, Canvas is a bargain and can easily serve as the only graphics program most users will ever need.

— Eric Taub

Get Info

Canvas

Published by: Deneba Software,
3305 N.E. 74th Avenue, Miami, FL
33122; (305) 594-6965.

Version: 3.0.

List Price: \$399.

ORGANIZATIONAL TOOLS

Fair Witness

Fair Witness teams an outliner with a database program to help you manage projects from brainstorming to completion.

Fair Witness, a striking new variation on an old software theme, incorporates elements you normally associate with outliner, database, and spreadsheet programs. The result of this unique combination is an application with considerably more depth than traditional outliners have. Fair Witness is an invaluable tool for capturing, organizing, and following through on project ideas. As its name implies, the program serves as an accurate and impartial recorder of all the thoughts and plans that go into a project, whether it's managing a department or writing a thesis.

Much More Than an Outliner

Under the skin, Fair Witness is essentially an amalgam of outliner and database program, with some handy presentation and project-management tools thrown in. Although it isn't a substitute for your word-processing, database, or spreadsheet application, it performs some important functions of all of these. In comparison with other software types, it comes closest to replacing your outliner, although Acta and MORE users will likely hold on to those packages for their printing capabilities, which are more flexible than those Fair Witness offers.

To begin developing and organizing a project with Fair Witness, you create ideas and subideas and arrange them hierarchically, just as in an outliner. Fair Witness gives you free rein to drag your ideas around; reposition them; and indent, outdent, delete, insert, expand, and contract entries.

After you've typed in your first flush of ideas (you can always add more later), you organize them by dragging them into category bins that you set up at the bottom of the screen. These bins ease the organizational process by letting you see clearly what remains to be categorized properly.

You can view your outline as a whole or in part. When you drag an idea to a small hierarchical pop-up menu at the top left of

the screen, it becomes the current "headline." Only the topics below that headline are visible, but you can move back up the tree by using the pop-up menu to see more of your outline. A useful option that's missing from other outliners places all ideas that are at the same level in the hierarchy on separate pages so you can simply flip through them.

Once you've recorded the basic ideas that form the foundation of your project, it's time to start attaching information to these ideas. This is where Fair Witness goes well beyond basic outliner programs. You can, for example, attach job titles and salaries to the list of employees involved in a particular project. To attach information, you create an information chart, a spreadsheetlike series of columns that holds text, list, date, number, icon, picture, and rating data. Sounds can also be attached to these columns. The spreadsheet rows represent the ideas and subideas in your outline.

To create custom reports and views of your data, you can hide selected columns and rows, save your views, and switch among them at will.

Text columns are designed to contain notes, names, tasks, and titles. You can even create a series of entries within a single text cell. This ability lets you save

earlier versions of your data, including time stamps, or list more than one entry in a cell, such as a set of names assigned to one task. Series data can be displayed simultaneously or paged through, entry by entry.

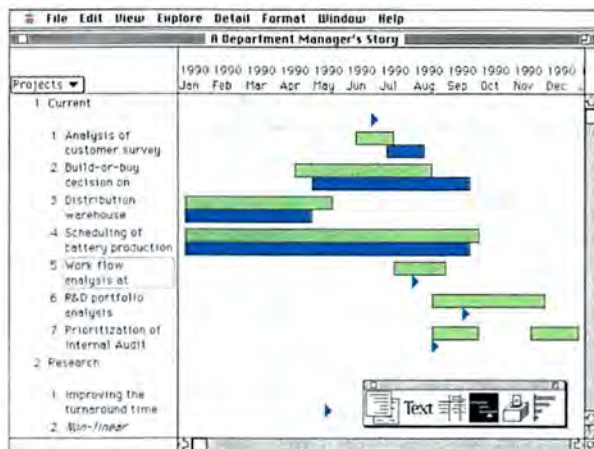
List columns are essentially text columns with predefined entries (such as lists of people) that appear on a pop-up menu. Lists must appear as ideas with subheads somewhere in your outline. The subheads then become options on the pop-up menu.

Icon and picture columns hold graphics data. Icons, which must fit in a 32-x-32-pixel area, can be pasted in or drawn on-screen in fat bits. Icons can be attached to categories, so that the bins at the bottom of the screen display the appropriate icons. Graphic elements of any size can be pasted into a picture cell via the Clipboard. You can't directly import pictures, but you can resize them once you've placed them.

Number columns are self-explanatory. Formatting options are limited to choosing the number of decimal places. You can't add things such as dollar signs or percent symbols. Limited calculation functions let you obtain aggregate data for sets of subideas, such as the average, sum, minimum, maximum, and count.

Date columns deliver project-management capabilities to Fair Witness. You can store single dates or durations within date cells. In the basic information chart, dates are shown in text format, but switching to Fair Witness' time-chart view lets you see them graphically as milestones and bars. You can enter dates in either view, although it's often easier simply to click and drag a bar in the time chart than to type two dates in the information chart.

All date columns currently showing in the information chart are displayed in the



Fair Witness is a powerful organizational tool that's best characterized as a superoutliner. It also combines elements of database, spreadsheet, and project-management software to help you develop and execute plans.

Find your documents and applications instantly — Tiles automatically organizes them for you.

One tile can log on to CompuServe, get the latest stock prices, drop them into your spreadsheet and print it all out.

Instantly switch between printers or network volumes in a click — *without* the steps and delay of using the Chooser.

Make your favorite QuickKeys into tiles! QuickKeys' demo is included.

Easily personalize your tiles by importing, colorizing and modifying graphics. A full library of color icons is included.

Project Tiles bring it all together. One tile can mount remote volumes, open an org chart program and a color paint program — so all your tools and data are ready to use at once.



TILES.

PROTECTION FROM THE LITTLE ELVES WHO INVADE YOUR MAC AND HIDE THINGS WHILE YOU SLEEP.

A BETTER WAY TO ORGANIZE YOUR WORK.

Some mornings it seems like someone's come in and hidden your work, doesn't it? If so, get Tiles™ protection.

Tiles puts everything you need to work at your fingertips, so you spend less time getting back to work and more time getting work *done*. Tiles tracks the applications and documents you use as you work, and creates easy-to-use icons called "tiles." So when you need to get back to work, just click a tile —

no need to search through mazes of folders, launch a myriad of applications located on different servers, or try and gather all the pieces of that big project together again. Tiles remembers what you work on and where it is — just double-click.

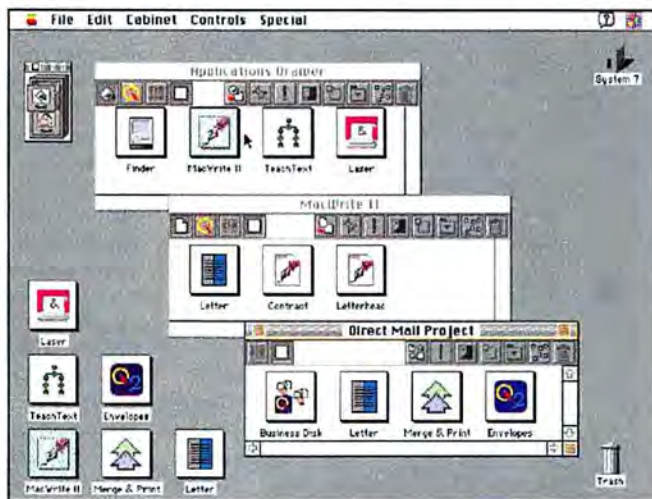
If you share a Mac, you'll never have to worry where your "Macmate" may have filed things.

The tiles you use most often reside on your desktop in neat, organized windows. You can even create tiles for your favorite QuickKeys™, and launch your most complex tasks with a double-click!

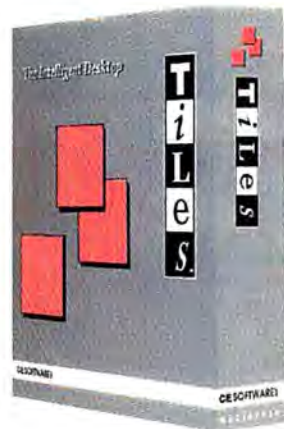
INSTALL IN MINUTES—SAVE HOURS.

Set up Tiles once and never think about it again. It runs automatically and transparently in the background, and gives you the easiest way to automate and organize your work. Simply specify how many tiles you want, where they go, how long to keep them around — even what size to make them.

Face it, occasional catastrophes are nothing compared to the daily time lost from little things that go astray. If you knew how much time you lost daily just getting organized, you'd be amazed.



Tiles — the intelligent desktop — keeps copies of frequently used tiles on your desktop for instant access. Find out how easy your work can be — just call for our free demo.



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CE SOFTWARE INC

Connecting people and productivity.

The screenshot shows the Fair Witness software interface with a menu bar (File, Edit, View, Explore, Detail, Format, Window, Help) and a title bar (A Department Manager's Story). The main window displays a table with columns: Employees, Employee start date, Salary, and Position. The table lists various employees and their career progression, including Steffi Smith, Zina Smith, Stan Smith, Martina Smith, Jimmy Smith, Yannick Smith, Henri Smith, Ivan Smith, Gabriella Smith, and Björn Smith. A 'Text' window is also visible in the foreground.

Employees	Employee start date	Salary	Position
Steffi Smith	Dec 1, 1979	64000	Manager
Started	Dec 1, 1979	24000	Senior Analyst
Salary Increase	Dec 1, 1980	4000	
Promotion	Aug 1, 1981	6000	Principal Analyst
Salary Increase	Feb 1, 1983	4000	
Salary Increase	May 1, 1985	6000	
Salary Increase	Sep 1, 1987	8000	
Promotion	Dec 1, 1989	12000	Manager
Zina Smith	May 1, 1980	48500	Senior Principal
Stan Smith	Mar 1, 1989	45000	Senior Principal
Started	Mar 1, 1989	45000	Senior Principal
Martina Smith	Aug 1, 1978	37500	Principal Analyst
Jimmy Smith	May 1, 1977	45000	Senior Principal
Yannick Smith	Jul 1, 1990	38000	Senior Analyst
Started	Jul 1, 1990	38000	Senior Analyst
Henri Smith	Jun 1, 1985	43000	Principal Analyst
Ivan Smith	Feb 1, 1980		
Gabriella Smith	Mar 1, 1980		
Björn Smith	Jul 1, 1980		

What sets Fair Witness apart from traditional outliner software is the ability to attach detailed information to categories and subcategories, using a spreadsheetlike series of columns. Here, employee start dates, job titles, and salaries are filled in.

Fair Witness can open and save text files in tab-delimited format. Text files saved with Acta and MORE open with hierarchies intact, but text files saved with Fair Witness can be opened only by a word processor or a spreadsheet program, because regular outliners don't allow for columnar data.

Fair Witness comes with a prodigious amount of documentation. The three manuals and a videotape are all designed to help you understand the concept of a *work processor*, the term invented by Chena to describe Fair Witness. Although we would have preferred a more streamlined approach, the manuals are clear and well written. The technical-support number is displayed in huge type in several places throughout the manuals, and we received instant, courteous, and extremely knowledgeable replies to our questions, many of which will be addressed in the new version of Fair Witness that will be available by the time this review appears.

Fair Witness is System 7-compatible, but the only specific System 7 feature it supports is TrueType.

The Bottom Line

Although Fair Witness appears unique at first glance, it's really a superoutliner that's helpful for managing a wide variety of projects. People already use outliners as tools to brainstorm and to organize their work, but Fair Witness goes a good many steps further than outlining software. It extends the concept in a way that's both intuitive and useful for managing projects to their completion. We could quibble and say that to be a true work processor, it needs even more features, such as a linked address and phone directory with label-printing capability or more calculation functions, but that would be missing the point. The point is that the program defines a new and welcome product category that will likely burgeon in the near future.

— Becky Waring

time chart simultaneously, so you can set up one column for projected dates and another for actual ones and then see how they overlap. You can also change the symbols used for each of the date columns, so you can distinguish them on the combined time chart. A serious omission, however, is a key to the chart symbols (an upcoming new version is expected to correct this problem).

How Do You Rate?

Finally, an unusual ratings column lets you tally votes and scores for lists of ideas. Several rating schemes are possible, from simple ranking to weighted averages of many voters over multiple criteria. Fair Witness can display numeric results in a column in the information chart or as a bar or pie chart.

In addition to working in the structured environment of the outline and information chart, you can view and enter data on a free-form "white board" that can be as large as 100 x 100 inches. The free-form view is perfect for moving ideas around, finding links among ideas, and brainstorming as a group. It also lets you set up organization charts and project flowcharts with boxes and arrows. You just click on an idea to drag it anywhere on-screen. You can even align messy data by use of a special command.

Connect Me and Go Back are HyperCard-like features that help you navigate complex Fair Witness documents. Connecting two ideas attaches an arrow button to each. Clicking on the button takes you

directly to the connected idea. Go Back keeps a list of all the ideas you've traversed (up to a number you specify), and you can call it up and retrace your path.

To further customize your Fair Witness reports and views for presentation, you can change the font, style, size, alignment, color, border, width, and background pattern of any cell or group of cells. Next, you can decide whether to show all the contents of a cell or just the first line. You can also sort by any text, number, date, or symbol column, in ascending or descending order. The ability to sort by symbols such as check marks is especially valuable, although we wish Fair Witness supported multilevel sorts.

Fair Witness' Find command looks for a particular text string and can replace it globally with another. The Search command can pinpoint text, numbers, dates, and symbols in any column. It can also select or deselect all ideas that match or don't match the search criteria.

Printing is WYSIWYG. Simply arrange your data on-screen as you want to see it printed, whether it be the information chart, time chart, free-form white board, or ratings chart. You can set page breaks manually with a vertical ruler. A handy Preview function lets you adjust margins visually and add headers, footers, and page numbers. One pet peeve is that column formats are not saved with layouts, so if you prefer one format for printing and another for on-screen viewing, you must manually change formats every time you print.

Get Info

Fair Witness

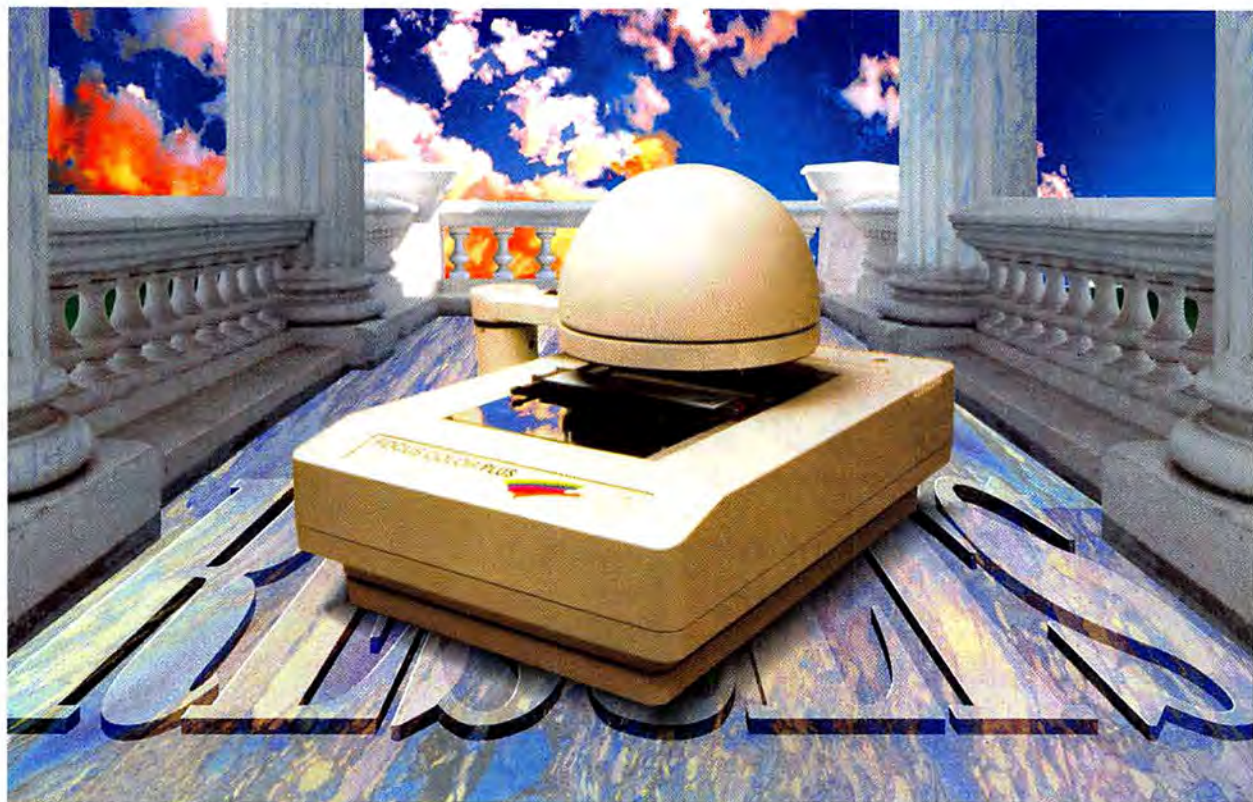
|||||

Published by: Chena Software,
905 Harrison Street, Allentown,
PA 18103; (215) 770-1210.

Version: 1.0.

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7 min

1925

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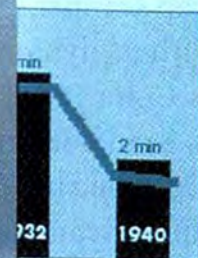
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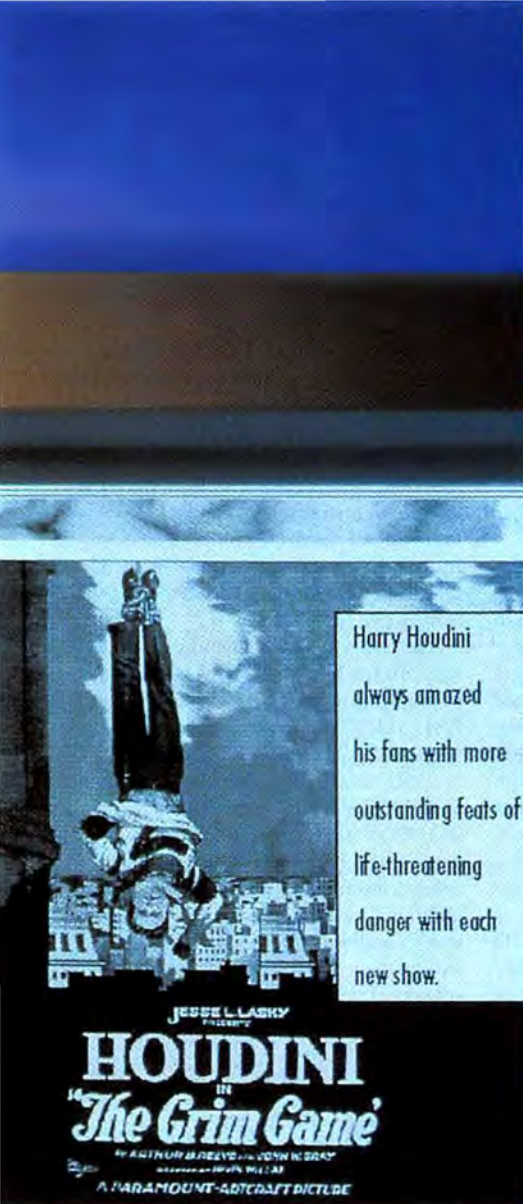
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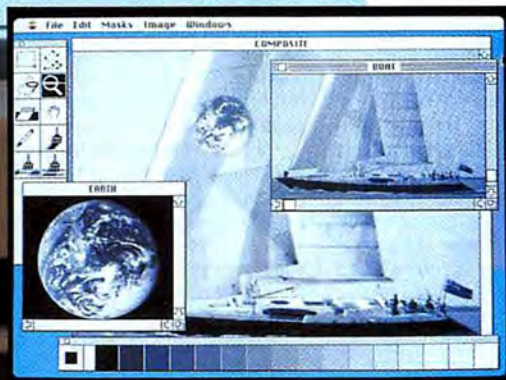
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DISPLAYS

Ovation

Speed, brilliant color, and a unique interactive-pointer system are hallmarks of this new color LCD panel from Proxima.

Until now, the choices for displaying interactive, Mac-based boardroom presentations were both limited and impractical. Proxima has changed all that with the introduction of its stunning active-matrix color LCD panel. Not only is the Ovation a more affordable and portable alternative to bulky video-projection systems but it's also a new breed of panel that successfully addresses the deficiencies of previous color LCD panels.

Standing Ovation

Attached to the video output of your computer, color LCD panels display what's visible on the monitor. By placing an LCD panel on an overhead projector, you're able to project your monitor's image onto a large screen.

Prior to the Ovation, LCD panels suffered from poor contrast, a limited number of colors, and slow screen-refresh rates. In addition, interacting with projected images was clumsy at best. Proxima has addressed all these problems with the Ovation, which projects vivid color images. Moreover, Proxima also makes an optional pointing device, called the Cyclops, that frees presenters from using the keyboard and mouse to control computer-based presentations.



The Ovation is an active-matrix LCD panel that projects a stunning color image of your Mac's screen for presentations. It's also fast enough to project live video.

The Ovation is really a video-projection system that uses color-LCD technology. Its active-matrix panel and high contrast ratio produce bright and clear 640-x-480-pixel images. Color quality is also outstanding. The Ovation's projected images look as good as those on-screen.

Older color LCD panels did a poor job of projecting the exact colors that were on computer screens, because the panels used only mapped colors. The Ovation, however, projects your Mac's *true* colors, so purples are purple and browns are brown. The panel can address as many as 3,375 true colors. Passive-matrix LCD panels also suffer from notoriously slow refresh rates that limit the kinds of

presentations they can project. For example, older panels are typically too slow for computer animation, because they can't keep up with the 10 or 15 frames per second required. In addition, even simple actions such as moving the cursor across the screen can cause smearing.

The active-matrix Ovation's action, on the other hand, is crisp and clean. It's even fast enough to display computer animation without smearing colors or dropping frames. In fact, the Ovation is so speedy that it can handle real-time video at 30 frames per second.

The Ovation's built-in multisync video supports the Mac II, the IBM PC graphics standard through VGA, and the NTSC and PAL video-broadcast standards. It also supports S-VHS for VCRs, laserdisc players, and camcorders. In Video mode, the panel's color palette expands to more than 24,000 colors. Because it lets you switch among different video sources, you can attach a laserdisc player to a Mac and then alternate between computer-generated images and real-time video or combine the two on the same screen, using a card that supports live video in a window.

It's Polite to Point with Cyclops

The Cyclops is an interactive pointer that lets you control Mac-based presentations directly from images projected by the Ovation panel.

With the Cyclops interactive-pointer system, Proxima has solved a problem that has long plagued makers of computer-based projection systems: how to let presenters interact with the computer without chaining them to the keyboard and mouse.

The \$1,195 Cyclops has two components: a wand that works essentially like a cordless mouse and an optical sensor eye that attaches to the Ovation panel. When you press a button on the wand, a red LED lights up at the tip. To operate the wand, you must first align and calibrate the sensor eye with the projected image. The process is easy but requires an Ovation-compatible overhead projector (contact Proxima for a list of compatible projectors). After that, using the Cyclops is a snap. You can stand next to the projection screen and control your Mac by placing the tip of the wand directly on or near the projected image.

When you press the button, the device's sensor eye accurately maps the position of the wand onto the computer screen and commands the cursor to move to the spot you're pointing at. As long as the button is held down, the cursor will follow the wand around on-screen as in a click-and-drag operation.

The cursor tracks the wand pointer to within a few pixels, close enough to make you feel that you're interacting directly with your Mac. You can select icons, menus, and text by clicking with the pointer on different parts of the projected image.

For those who want the freedom to pace and mingle with their audience during a presentation, Proxima also makes a \$395.95 Laser Pointer, which works with the Cyclops, allowing presenters to operate the computer from as much as 25 feet away from the projection screen.

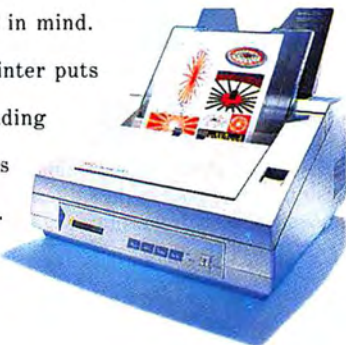


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Work Sets and System7

Find out about new system capabilities which will save you from the drudgery of repetitive work

What makes a computer environment efficient? Some will say it's being able to run a batch of commands by committing unnatural acts with your keyboard, such as typing something like: `find . -name a.out -o -name '*.o' -atime +7 -exec rm {} \;` Most Macintosh users would disagree.

Greater efficiency and increased convenience should not mean learning a different and unfriendly language. The System 7 team knew that, too, when they opened the door for a more efficient Macintosh environment.

An Alias By Any Other Name

If you have System 7, you've probably already discovered aliases. An alias looks like a copy of a document, but it's really just a tiny file (about 1 to 2K in size) that directs your Macintosh to the original document. Aliases come in handy when you want quick access to programs or documents located deep inside your hard disk. Make an alias and place it right on your desktop, or even in the Apple Menu folder (in which case the alias is listed in your Apple menu).

A Step Beyond

The release of System 7 has sparked the appearance of utilities designed specifically for its powerful capabilities. One of these is Kiwi™ POWER WINDOWS, the first comprehensive window and document management tool. It offers a sophisticated and flexible window placement system that helps you maximize your use of available screen space in all your applications.

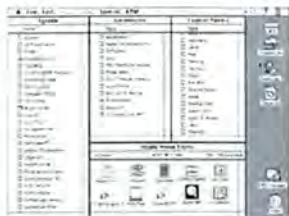
It also features a document management system that takes the alias concept into a new dimension.

Work Sets: The Next Frontier

The Kiwi POWER WINDOWS document management system is based on an idea called Work Sets. If you're a "power user" and use aliases, you'll love Work Sets.

Like aliases, Work Sets are tiny files which can reside anywhere on your hard disk. But instead of referring to a single file, Work Sets represent a group of files and their associated windows. When you open a Work Set, Kiwi POWER WINDOWS automatically launches applications, opens every document in the set, and restores all corresponding windows to the positions they occupied when you originally created that Work Set. They can also contain documents from several applications.

Work Sets can even include Finder windows (folders) that you use often, and like to see displayed in a certain way. Just imagine: one click and your System, Extension, Control Panel, and Apple Menu Items folders all pop open, ready and waiting for another round of System maintenance.



Work Sets make life easier by providing instant access to groups of windows, documents and files—with one click of the mouse.

Finder Work Sets are terrific for shared volumes and CD ROMs, providing a quick way to display contents of those disks in a personalized manner that suits your needs.

Work Sets will empower you to mold your Macintosh into an efficient work environment that fits you like a glove.

Smart Stuff

You might ask what happens if you move or rename the documents which are part of a Work Set, or if you change screens, or if you want a document from one application to be opened by another? Kiwi POWER WINDOWS will handle that—and more. You can even send Work Sets to colleagues on the same network and it will retrieve documents on a shared disk, or ask for a particular floppy. This product is not a gimmicky, window dressing gadget. It's a real power user tool.

Get The Facts

Work Sets are only one of Kiwi POWER WINDOWS' advanced capabilities. With its Window Layouts, it manages windows as effortlessly as it manages documents and folders.

For more details, call the Kiwi Software information line at 1-800-321-5494. And if you mention that you saw this advertisement in MacUser, you just might get lucky: every 50th caller will win a free copy of the program. One call per person, valid while quantities last.

Kiwi POWER WINDOWS is available from your software supplier, or directly from Kiwi Software. Suggested retail price \$79.95.

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NEW ON THE MENU REVIEWS

The switches that control the Ovation work much like standard color-television controls for adjusting contrast, color intensity, and tint. The Ovation also has freeze-frame and reverse-image controls, so you can use it with rear-projection screens. For simple interactive work, the remote control (with accompanying software) provides slide-projector-like controls such as advance and reverse slide.

But what's most innovative about the Ovation is the Cyclops, an optional input device that makes it as easy to work on projected images as it is to work directly on your Mac's desktop (see the "It's Polite to Point with Cyclops" sidebar).

The Bottom Line

At \$8,495, the Ovation color LCD panel is pricey. But in contrast with video-projection systems that typically cost \$15,000 to \$20,000, it offers a better solution for about half the price. With its active-matrix display and crisp action, it makes projected images look as good as those on the Mac's screen. However, we wish that the Ovation *didn't* require a monitor to be attached to the Mac in order for the video to become active and that it *did* come with a carrying case (the panel weighs less than six pounds).

These quibbles notwithstanding, we applaud Proxima for covering almost all the bases with the Ovation and the Cyclops. The panel produces sharp, clean colors; supports video; and works out of the box with Macs as well as PCs. In addition, Proxima's truly innovative Cyclops pointer system delivers an excellent one-of-a-kind solution for interacting with the Ovation's projected images. If you're looking for a power presentation package that's sure to impress an audience, the Ovation teamed with the Cyclops is it.

— Howard Bornstein

Get Info

Ovation

★★★★½

Manufactured by: Proxima Corp., 6610 Nancy Ridge Drive, San Diego, CA 92121; (619) 457-3297.

List Price: Ovation, \$8,495; Cyclops, \$1,195; Laser Pointer, \$395.95.

PROGRAMMING

TMON Professional 3.0

Learning to use the long-awaited upgrade to TMON Professional is no easy task.

TMON Professional 3.0 is ICOM Simulations' eagerly anticipated update to its popular low-level debugger. In the interim that separated version 3.0 from its predecessors, powerful new versions of Apple's MacsBug and Jasik Designs' The Debugger successfully enticed many programmers away from TMON. However, with version 3.0, ICOM Simulations has countered with a tool that offers even more features and power than previous versions. Unfortunately, TMON Pro is often frustratingly difficult to use.

TMON Professional has all the basic features you expect from a low-level debugger. It displays memory in hexadecimal and ASCII, disassembles code, and displays all blocks in a heap. You can set breakpoints on specific instructions in memory or on specific system calls (A-traps). You can also step through an application one instruction at a time while watching the registers change as the program executes. In addition, TMON Pro has an excellent trap-record command.

ICOM Simulations has added a new memory window to TMON Pro that displays your Mac's memory in a useful format that includes the name and format of each piece of memory. When looking at low-memory globals, for example, it labels each global; when looking at code, it disassembles the code; and when looking at data in the heap, it identifies each heap block. Another useful new feature is

the view window, which opens any text file on your disk. This capability provides an easy way to look at your source code while you're debugging it.

The new version also includes dcmds and macros, features that were previously available only in MacsBug. A dcmd is a routine written in a programming language such as C or Pascal that performs functions missing from the debugger itself. Dcmds are analogous to XCMDs in HyperCard. You can take a dcmd from MacsBug, for example, and plug it straight in to TMON.

TMON Pro's new and powerful scripting language goes well beyond a simple macro system. The scripting language is rather arcane, however, and decidedly not for the faint of heart. Remembering all the commands is particularly difficult, but intrepid developers will come to rely on the language once they've mastered it.

Version 3.0 also supports templates for displaying memory. The package provides several templates for common system data structures, and you can add your own data-structure templates.

TMON Professional disassembles 68000, 68020, and 68030 code. ICOM Simulations claims that version 3.0 can also disassemble 68040 code, although we weren't able to verify this. The new version is compatible with System 7 and is 32-bit clean.

TMON Pro is completely configurable,

TMON Professional is a powerful debugger that provides so many features that it can easily overwhelm you. Fortunately, ICOM Simulations has simplified some things, letting you set TMON Pro's many options from its TMON Settings control panel and edit scripts from within the application.



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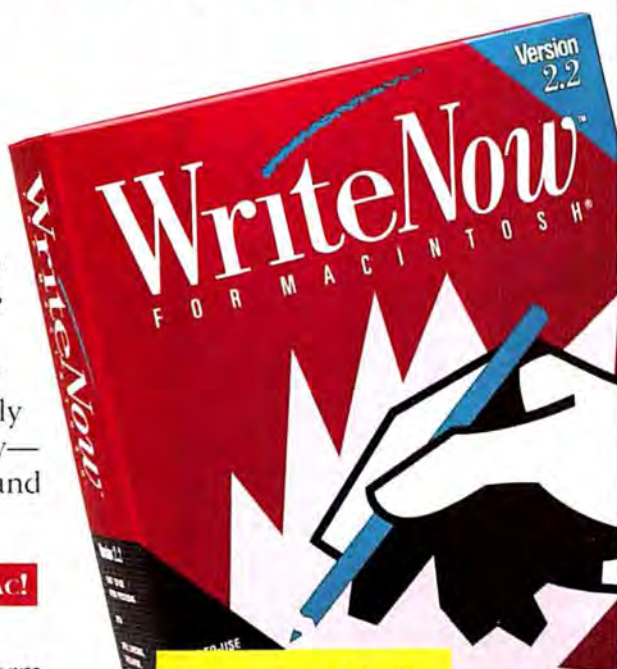
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Spell Checker (Size in words):	135,000	100,000	60,000	130,000
Grammar Checker (Bundled):	Yes	No	No	No
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CIRCLE 87 ON READER SERVICE CARD.

NEW ON THE MENU

REVIEWS

which is a good thing, because its features are not always easy to access or convenient to use. Unfortunately, the process of configuring TMON is far from intuitive, even for experienced programmers.

Another decided drawback is TMON Pro's size. A typical configuration needs about 950K of RAM, although the minimum configuration takes as little as 400K. We recommend a minimum of 2 megabytes of memory to use TMON Pro effectively and 4 megabytes for optimal use. However, even with a hefty amount of RAM installed on a Mac IIx, TMON Pro still suffers from sluggishness.

Plan to spend a good amount of time learning how to use TMON Pro. Even for those who've mastered the previous version, 2.8, the new version requires considerable study and experimentation. Unfortunately, the documentation and tutorial don't ease the process.

And if you're counting on technical support to help you over TMON Pro's steep learning curve, we have bad news. Phone support is unavailable, although technical support can be accessed through AppleLink, CompuServe, and America Online and by fax.

In its favor, the new version of TMON fixes an annoying problem. Previous versions produced jarring displays when used with color monitors, but we're happy to report that version 3.0 works without a hitch on color monitors, two-page displays, and multimonitor Mac II systems.

The Bottom Line

Once you've mastered TMON Professional 3.0, you'll find it a powerful debugger. However, the program's plethora of features makes it difficult to learn and use, and its performance, even with a substantial amount of memory, is frustratingly sluggish. Overall, we recommend TMON Professional 3.0 over other debuggers only to advanced programmers who need its unique features.

—David Shayer

Get Info

TMON Professional

Published by: ICOM Simulations,
648 S. Wheeling Road, Wheeling,
IL 60090; (708) 520-4440.

Version: 3.0.

List Price: \$250.

UTILITIES

Now Utilities 3.0

Now Utilities is a Swiss-army knife of system enhancements that can make you even more productive under System 7.

Refusing to rest on its laurels, Now Software has devised an even more robust Now Utilities system-enhancements package. Version 3.0 includes several new tools as well as enhanced versions of existing Now utilities, making it the most complete collection of Mac system enhancements to reside in a single package. Best of all, each of the ten utilities included in version 3.0 is System 7-compatible and several add significant value to specific System 7 functions.

The current version of Now's StartUp Manager works with System 7's multi-folder System Folder, giving users control over which extensions and control panels are to load and in what order. You can also create groups of extension files and assign a keystroke to each group to invoke it at startup.

StartUp Manager can also define links between related extensions and control panels, so that when one is turned on, those related to it are either activated or turned off automatically (the latter is a good way to eliminate conflicting extensions).

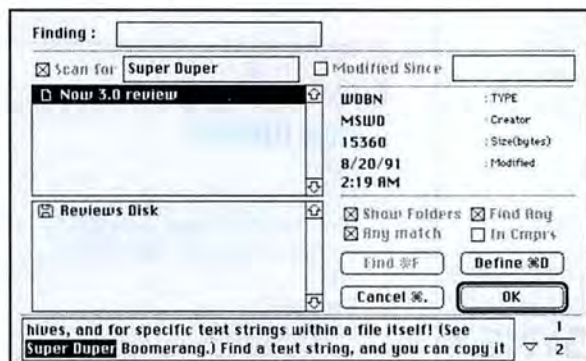
These are all nice touches, but the real Now centerpiece is Super Boomerang, a utility that adds lists of recently opened files and folders to all standard Open/Save dialog boxes as well as to the File menus of most programs. New with version 3.0, Super Boomerang's search capabilities are combined with the Finder, creating a Super Boomerang entry on the Apple menu that displays a hierarchical list of

recently accessed folders and files. When you select a folder, it opens in the Finder. When you select a file, it's launched.

You can also opt to use Super Boomerang's fast search features from within the Finder. As before, the search criteria can be filename and last save date, but version 3.0 also lets you search for specific text strings within a file. Also new is the ability to search within StuffIt and Compactor archives.

Under System 7, NowMenus lets you create hierarchical submenus, as much as five folders deep, for folders you've elected to display on your Apple menu, and you can open items and files contained within the folders directly. The utility also creates submenus for all Apple-menu items, the Chooser, and the Control Panels folder, so you gain instant access to these items as well. You can set NowMenus to pop up your Apple menu when you click anywhere on the desktop and to drop menus down automatically whenever you move your mouse into the menu bar.

MultiMaster provides a fast route to launching applications and files by letting you bypass the Finder with a MultiMaster pop-up window or pull-down menu that you configure. The window and menu, which you bring up with hot-key combinations, contain listings of applications and files you can select and launch quickly, using either keyboard command equivalents or the mouse. MultiMaster also provides helpful memory-management



Now Utilities 3.0 is a superb set of system enhancements that lets you customize your Mac for optimal efficiency, especially if you're running System 7. The Super Boomerang utility, shown here, has a search function for finding specific text strings within files.

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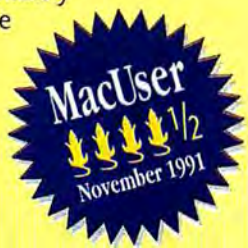
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NEW ON THE MENU REVIEWS

tools that show you how memory is being used on your machine and allow you to change memory allocations.

WYSIWYG Menus was a sleeper in the previous version of Now, but it's back with a vengeance in 3.0. It allows you to combine font families into hierarchical listings, as does Adobe Type Reunion, and it can also display each font's name on the menu in its own typeface. The utility even displays size and style menu items in the selected style and size. A Now control panel lets you rearrange fonts on your Font menu, and you can choose whether a font will be displayed in its own face or in the system font.

To protect your data, the NowSave function lets you specify when and how applications are to go about automatically saving open documents. You can specify the number of minutes, keystrokes, or mouse clicks that are to elapse before a file is saved. A special control panel lets you set the NowSave function, but you can also opt to have it appear on the File menu of all or selected applications.

Now's DeskPicture lets you replace standard desktop patterns with multiple color or black-and-white PICTs. The program's Screen Locker is a screen saver that doubles as a security guard, allowing you to set it to lock your screen. Now also includes AlarmsClock and a miniapplication called Profiler, which can document a surprisingly detailed amount of information about your Mac's hardware and software configuration.

The Bottom Line

At a list price of \$129, Now Utilities 3.0 gives you far more bang for the buck than a mishmash of similar utilities from other commercial and shareware publishers. If you're looking for the best route to a customized Mac that's optimized for efficient operation under both System 6 and 7, Now Utilities 3.0 is your ticket.

— Eric Taub

Get Info

Now Utilities

Published by: Now Software, 520 S.W. Harrison Street, Suite 435, Portland, OR 97201; (503) 274-2800.

Version: 3.0.

List Price: \$129.

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ALL NEW

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TFLX

TFLX is a do-it-yourself programmable system that provides a unique route to custom voice-mail applications.

TFLX is a sophisticated programmable single-line voice-mail system with features that go well beyond those of expensive multiline systems. In essence, TFLX merges a telephone line with a computer so the computer can be programmed to automatically handle a variety of telephone-based applications, ranging from simple personalized voice systems for any number of mailboxes to elaborate, multifunction front ends for technical-support departments.

May I Take Your Order

The \$1,750 professional-level TFLX package (which includes all the modules) comprises a hardware box, which plugs in to both the serial port of the Mac and a phone line, and the software that controls the box. To run TFLX, you need a dedicated Mac with a hard drive and at least 2.5 megabytes of RAM, although 5 to 8 megabytes will make development of your voice-mail applications go much more smoothly.

The version we tested recommended using System 6.0.5, but by the time you read this, a System 7-compatible version should be ready. The TFLX box can dial out over the phone line, but it doesn't contain a modem and can't transfer data.

What it can do is digitize and save voice messages, reply with digitized messages you've created, recognize and branch on or save touch-tone inputs, dial out to another phone or PBX system, search a database file and retrieve information, calculate and branch on text or numeric values saved in variables, and perform or modify events at specific times.

So, for example, you might use TFLX to develop an order-entry system that takes orders from customers and gives prices, discounts, availability, information, back orders, and account balances.

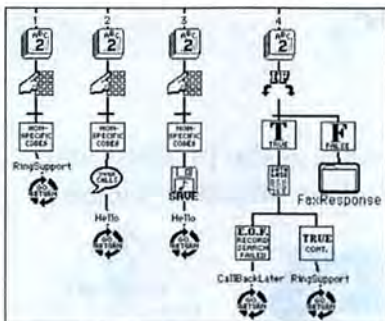
The feature that makes all these capabilities possible and that distinguishes TFLX from other voice-mail systems is the Picture Programming Language. To develop voice-mail applications, you

select icons that represent different functions and string them together into flowcharts or scripts.

It takes a few days to get proficient with TFLX's Picture Programming Language and to understand some of its more sophisticated features. By comparison, learning to use TFLX is only slightly more difficult than learning to use FileMaker Pro, about the same as learning to program simple HyperCard applications, and considerably easier than programming with 4th Dimension.

The TFLX programming model is designed to provide scripts that are as bullet-proof as possible so that the system can run unattended. This makes programming somewhat intimidating at first, but you'll appreciate this aspect of TFLX later as you build more-complex scripts.

TFLX is sold as five modules: The main module comprises the hardware and entry-level software; the four others provide optional software. Each of the software modules adds progressively more abilities to the system. For example, the entry-level package allows an unlimited number of voice-mail boxes. At its most advanced level, TFLX provides a Fax on Demand module, which sends previously prepared fax documents to a fax machine on a callback basis or during the same incoming call. This requires a separate fax modem



TFLX is a hardware/software package that lets you set up your own Mac-powered voice-mail system by stringing together Picture Programming Language icons.

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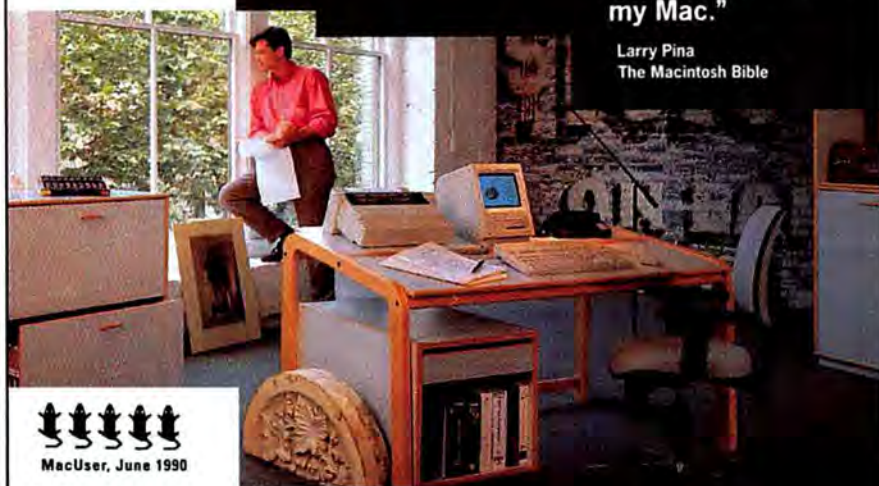
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NEW ON THE MENU

REVIEWS

that's compatible with BackFax, a program from Solutions International.

The complete TFLX system comes on 14 floppy disks, totaling about 10 megabytes of files, most of which provide examples of voice-mail, remote-address-book, fax-on-demand, order-entry, and automated-survey applications. You'll find yourself borrowing from the examples extensively as you develop your own applications. The TFLX manual is written with novices in mind, so programming experience is not required.

The Bottom Line

If you're looking for a way to obtain simple voice-mail capability for your own personal needs, TFLX is more than you need. You may want to consider a smart answering machine or sign up for one of the new voice-mail services offered by the phone company. Some sophisticated modems also provide simple voice-mail capability.

At the opposite extreme, if you're looking for a voice-mail system for a thousand people, TFLX isn't for you. Each TFLX system can handle only a single phone line at a time, and it's difficult to chain systems for sharing mailboxes. On the other hand, you may find TFLX useful as a front end to a larger voice-mail or phone system, because it can be programmed to route or screen calls.

TFLX shines, however, as a development tool for sophisticated voice-mail systems that can do virtually anything over a single phone line. If you're looking for a way to provide automated information distribution via voice, such as on a 900 line, or via fax for sales inquiries, TFLX may be your best bet. Although it will take you some time to master its unique programming language, TFLX can provide a wide range of applications, all of which can be controlled remotely from a phone.

— Peter and Allen Baum

Get Info

TFLX

★★★★

Manufactured by: Magnum Software, 21115 Devonshire Street, #337, Chatsworth, CA 91311; (818) 700-0510.

List Price: Entry-level system, \$495; Professional-level system, \$1,750.



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GROUPWARE

Instant Update

ON Technology's workgroup application lets users collaborate on creating and editing documents over a network.

Billed as a live-document processor for workgroups, Instant Update represents a bold next step in the groupware-applications arena. By allowing users to collaborate on documents over a network, Instant Update scores highly as both a word processor and a network application. If you're already adept at using E-mail, you're likely to take to Instant Update almost instantly.

Keeping Everyone Up-to-Date

Workgroups creating and editing common documents over a network are faced with two major dilemmas: how to track the most current version of a document and how to coordinate group input. Prior to Instant Update, Mac programs that addressed the need for group document processing took one of two approaches. Mainstay's MarkUp created virtual copies of original documents and allowed users to edit overlays of the original. Group Technologies' Aspects let users

work directly on live documents as long as all group members were present.

Instant Update, however, takes the best approach. It enables users to work locally on live copies of a master document that's updated to and from a server. Instant Update notifies all members of the workgroup when changes are made to the master, so you know you're always working on the most current version. Moreover, it provides an efficient and solid word processor, and as a piece of groupware, it operates intuitively. In fact, QuickMail users will notice a striking resemblance between their E-mail application and Instant Update.

Installing and managing Instant Update is a cinch. The program works on a client/server-database model over AppleTalk networks, maintaining separate files for each document. Server as well as user accounts can be password-protected. One workgroup per server Mac is the recommended configuration. Small groups (20

Document Management					
<div> <div>100: System Folder: Preferences...</div> <div>Zeno Contra Bartok (import) (on ...</div> <div>3 readers, 2 writers</div> </div>					
In	Out	Name	Last Modified By	Last Modified On	
		Michael Miley			
		1 Orpheus (import)	Anais Nin	Fri, 9/6/91 3:22pm	
		Quarter Tones-1			
		The New Flesh	Rama Krishna	Fri, 9/6/91 3:11pm	
		Zeno Contra Bartok (i...	Michael Miley	Fri, 9/6/91 3:03pm	
		Public			
		Instant Update Applica...	Rama Krishna	Fri, 9/6/91 3:28pm	
		iUpdate			
		First Test-1	Anais Nin	Thu, 9/5/91 8:05pm	
		Gettysburg Address	Michael Miley	Fri, 9/6/91 2:58pm	
		Live Document Samp...			
		Esther (import)	Rama Krishna	Wed, 9/4/91 4:04pm	
		In/Out Board - Sample	Michael Miley	Thu, 9/5/91 7:55pm	
		Instant Update Q&A			
		Memo to Salman	Anais Nin	Thu, 9/5/91 2:31pm	
		Proposal - Sample	Anais Nin	Thu, 9/5/91 8:35pm	
		Other Folder			
		Michael Miley, Tantra		Fri, 9/6/91 3:32pm	

Instant Update is a groupware application that lets users collaborate on documents over a network. The program's Document Management window uses icons to keep users informed about the status of their documents. Icons with lines indicate documents accessed from a master stored on the server; blank icons represent undistributed documents.

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users or less) can run the Instant Update server software on a Mac that's also running other server applications, but larger groups will find that a dedicated Mac is a wise investment. Different servers in different zones can be attached to one another so that workgroups can combine user lists and share documents with other workgroups.

However, users need not concern themselves with network-connection issues. Users work in a single Document Management window, where workgroup documents are organized by folder. All users have a personal folder, a public folder, and a folder that allows them to move Instant Update documents anywhere on their disk.

All folders containing live Instant Update documents appear in the Document Management window. Documents are listed by in/out status. In documents are those that have been changed at the server but not updated locally. Out documents signify those that have been changed locally but not forwarded to the master

copy on the server. Various icons indicate whether a document has been distributed or read.

Solid Word Processor

When you click on a document, a word-processing window comes up, complete with all the features you'd expect from a low-to-midrange word processor. Instant Update provides headers and footers; support for graphics and tables; and the ability to define fonts, styles, and rulers. Printing is straightforward, but there's no Print Preview option.

Users begin the collaboration process by creating documents locally with Instant Update or by importing them from other word processors. The program supports the Claris XTND filters, so importing formatted documents from other programs poses no problem. In fact, Instant Update passed all of our import/export tests with flying colors.

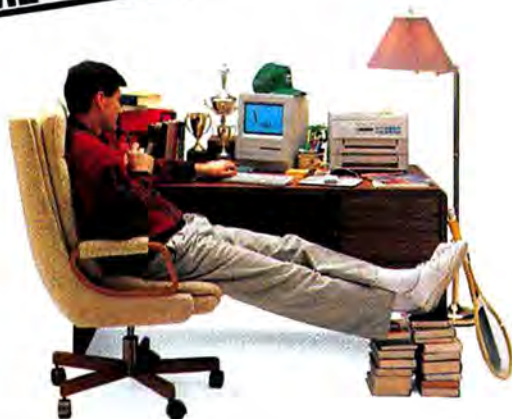
Once you've saved a document locally, you call up the list of users who are to work with the document and send the list to the

server. The participants are then alerted. The first time users in the group access the document, it's passed from the server to users' machines and saved locally. From then on, only *changes* to the document are passed between local machines and the server.

Changes are registered in several ways: If you've made a change, a gray change bar will appear to the left of the changed paragraph. If your document contains a change made by someone else to the master (thereby updating your version), a black change bar will indicate paragraphs with changes. When you click on a paragraph, Instant Update indicates (at the top of the window) who created it and who last modified it.

Unfortunately, these indicators don't provide as much useful information as they could. It would be helpful to have line-by-line indicators (signified by font or color changes, perhaps) that give you an idea of what and how much has been changed in a paragraph. The current method provides no way to compare

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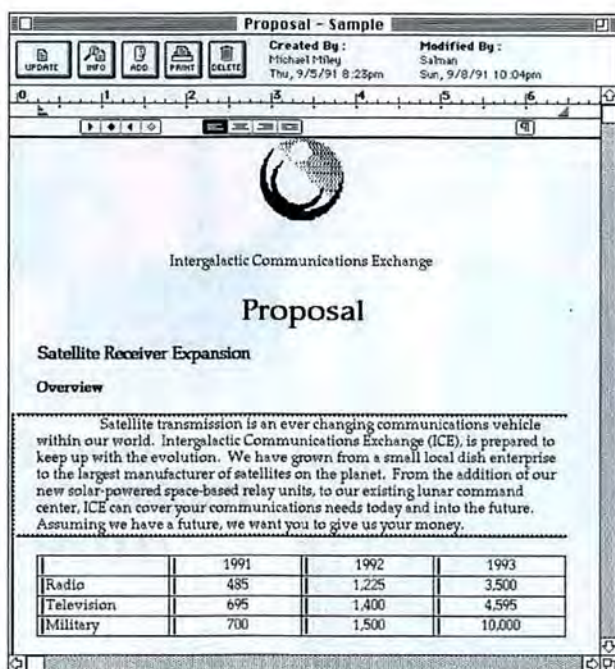
Shared office. Shared printer. Now here's the right match for one Mac or many. In fact, the 16 ppm microLaser XL is a natural fit for an AppleTalk® network. And like its slightly smaller cousin, this workhorse printer offers you either 17 or 35 scalable fonts, priced at \$2,899* and \$3,249*, respectively.

changes from one user's version to another. Nor can you refuse changes to documents, lock a paragraph against further alteration, or add notes to documents.

The one time you can review an original against a change is when there's a conflict. Conflicts occur when two people are simultaneously working on the same paragraph in a document. After one user has updated the master with a change, Instant Update freezes the altered paragraph when the other user tries to update the master. That's because the program is smart enough to know that the second user has not been working with the most current version of the document.

Instant Update's solution to conflicts is well designed. In a case such as the one above, for example, the second user must resolve the conflict before editing the paragraph in question. To do so, Instant Update allows users to flip between views of the master-copy version and their own version and opt to insert one or the other, or both, into the master copy.

Document creators are able to select



Instant Update's capable built-in word processor supports graphics and tables. The toothy frame around the paragraph shown here indicates a change that conflicts with the master document stored on the server. Instant Update is not only smart enough to recognize conflicts but it also provides a slick way to resolve them.

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 **TEXAS
INSTRUMENTS**

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Application

MacWrite II
Clarix Resolve
FileMaker Pro
MacDraw Pro
ClarixWorks
MacProject II
Clarix CAD
SmartForm Series
HyperCard
MacPaint

Story

How FileMaker Pro makes one man seem like a cast of thousands.



Jay Nathanson wears a lot of hats. His company – Target Marketing of Richmond, Virginia – is one of the fastest growing small businesses on the East Coast. Ask Jay to explain his success and he'll give you an uncharacteristically succinct response: FileMaker® Pro.

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CLARIS®

Simply powerful software.™

additional participants to work on a document at any time from the general or private user lists and groups, and they can take a master out of circulation (users retain their local copies). Users can also work off-line if the server is down, and once it's up again, updates can resume. Users can get information on a document at any time in order to track participation, and they can execute searches for changes according to author and In/Out/Conflict status. Administering the operation of Instant Update is a no-brainer. Using the administration program, administrators can register, add, move, and delete users (names can be imported from tab-, comma-, or space-delimited files or built from scratch) as well as attach and detach groups; rename users, groups, and documents; and move or delete workgroups and documents on the server.

Currently, however, you can't link workgroups over wide-area networks (over phone lines, for example) and the package's administration program doesn't include a backup utility.

The Bottom Line

Instant Update is the first successful group word processor for the Mac. By allowing users to work locally on live copies of a master document stored on a server, it not only provides a well-devised system for tracking the most-current versions of documents as they're circulated among workgroup members but it also comes up with a good solution for coordinating group input. The software flags conflicts that occur when two users attempt to change the same paragraph within a document and, even more importantly, supplies an amazingly painless way to resolve conflicts. A serviceable word processor and cleanly fashioned interface round out the list of Instant Update's achievements.

In addition to collaborating on documents, users will likely devise a wide variety of ad-hoc applications, from project management to group brainstorming, from general administrative tasks to time and resource management (using the table feature in creative ways). As the product

matures, we expect clever add-ins to enhance applications. For example, with screening and audit features, Instant Update could change the way editorial teams collaborate.

However, that's not to say that you should wait for future enhancements to Instant Update. It's an extremely useful piece of groupware as is.

— Michael Miley

Get Info

Instant Update

★★★★

Published by: ON Technology, Inc., 155 Second Street, Cambridge, MA 02141; (617) 876-0900.

Version: 1.0.

List Price: Two-user pack, \$495; five-user pack, \$995; volume discounts and site licenses available.

PHOTOREALISM



Artist: Jon Watson; image modeled and rendered entirely in StrataVision 3d.

StrataVision 3d is realistically the best 3D program on the Mac. ● Already donned with industry awards, there's even greater power with version 2.0. Extended modeling gives you more control over objects. Apply realistic textures, set reflectivity and soften shadows with improved ease. Animations of linked objects offer stunning results. StrataVision 3d 2.0 also has a realistic price; \$995. ● Whether you're an illustrator, a designer or an architect, we have the realistic solution. Call toll-free 1-800-869-6855 today.



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CIRCLE 84 ON READER SERVICE CARD.

BeagleWorks™ On The



A Mac's Best Friend

With the introduction of BeagleWorks, the true meaning of integrated software has finally been defined. BeagleWorks includes seven modules so fully integrated you can easily access the **Word Processor, Database, Spreadsheet, Chart, Paint, Draw and Communications modules** from anywhere in the program.

The word processor features irregular text wrap, multiple columns anywhere on a page and the Microlytics® 110,000 word Spelling Checker and 660,000 word Thesaurus. The Paint and Draw modules let you use up to 256 colors. The Spreadsheet boasts an automatic sum tool, as well as in-cell editing.

BeagleWorks has these and many other powerful features commonly found in stand-alone programs. It's easy for the novice to use, yet you won't outgrow its capabilities. Since it requires only 1 megabyte of RAM to run, BeagleWorks is an excellent solution for any Macintosh user.

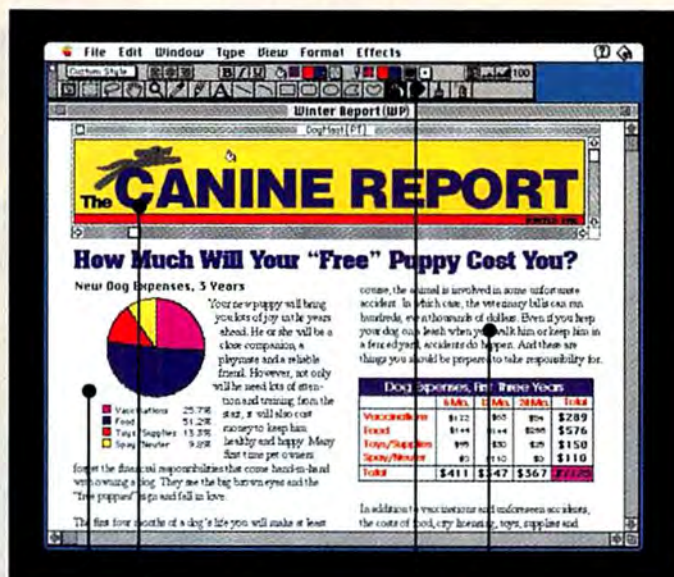
Beagle Makes Its Mark



Exclusive to BeagleWorks is a revolutionary technology called **In-Context Editing™**. This gives you the ability to access one file from within another by simply double-clicking. For example, if you have placed a graphic from a

paint file into a word processor document and decide to make a change, all you need to do is double-click on the graphic in the word processor. The Paint tools are added to the tool bar, the graphic becomes active and any changes you make are also made to the original file.

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- **In-Context Editing™** - Allows editing of one file from within another by simply double-clicking.
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- **Automatic Irregular Text Wrap** - Text takes on shape of the graphic.
- **Common Tool Bar** - Frequently used tools are easily accessible.

\$99.95**Upgrade
Offer!***

Has A Leg Up Competition

Integrated Software: Who Leads The Pack?

	BeagleWorks™	ClarisWorks™	GreatWorks™	Microsoft Works®
System 7 Savvy	YES	NO	NO	NO
In-Context Editing™ (multiple documents)	YES	NO	NO	NO
Paint module	256 Colors	NO	Black&White	NO
Common tool bar w/module-specific tools	YES	NO	NO	NO
Automatic irregular text wrap	YES	NO	NO	NO
Multiple columns can be turned on/off anywhere on the page	YES	NO	NO	NO



Savvy: You Bet! No Bones About It

BeagleWorks is System 7 Savvy: it takes advantage of everything System 7 has to offer, including Publish & Subscribe™! BeagleWorks even simplifies the process with Quick Publish™ and Quick Subscribe™ keyboard shortcuts. And you can even use Publish & Subscribe under **System 6.0!**

Old Dog / New Tricks

BeagleWorks is definitely marking its territory in the integrated marketplace. But we're not exactly a new pup when it comes to integration. Beagle Bros has been publishing software for eleven years. Beagle Bros also wrote AppleWorks 3.0, one of the first integrated programs for the Apple computer.

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*Contact QMS for availability of network options.

*Patent pending

PROJECT MANAGEMENT

Microsoft Project

Microsoft's project-management tool is powerful and flexible, but it will feel more familiar to Windows users than to Mac users.

Trailing its introduction last year of Microsoft Project for Windows, Microsoft has brought its highly regarded graphical project-management package to the Mac. The Mac version's striking resemblance to its Windows sibling is a calculated aim on Microsoft's part to meet the needs of organizations heavily invested in Project for Windows, which has already enjoyed considerable success. But despite its rich feature set and impressive flexibility, Microsoft Project will have limited appeal to users who expect Mac applications to drive like Mac applications rather than Windows applications.

Connoisseurs' Tool

With its custom reporting capabilities and flexible scheduling algorithms, Microsoft Project is a project-management tool for connoisseurs. As such, it delivers more depth and features than its chief competitor, Claris' MacProject 2.5. However, MacProject does a much better job of following conventional Mac interface guidelines.

Microsoft Project's chief strength is its flexibility. For one thing, its scheduling algorithms give users finer control over constraints than do those of MacProject. MacProject users are limited to As Late As

Possible and As Early As Possible constraints, for example, whereas Microsoft Project supports a total of eight constraints, including Finish No Later Than and Must Start On.

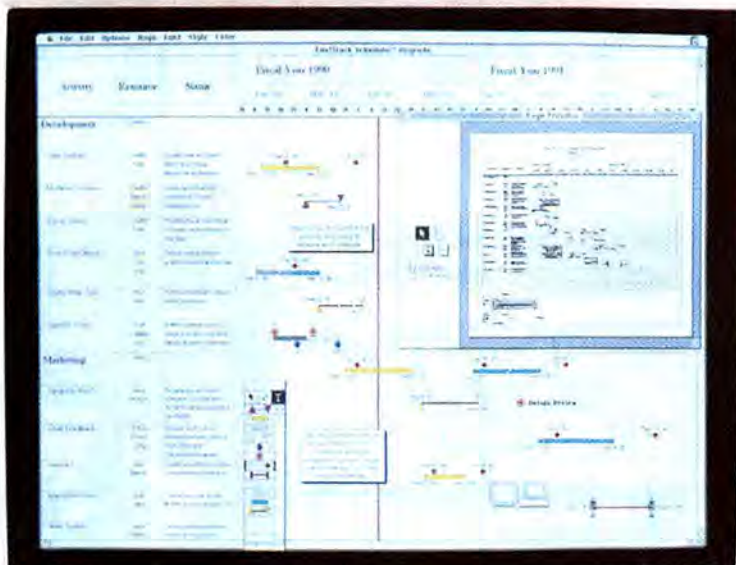
In addition, Microsoft Project provides more options for entering scheduling information than does MacProject. Spreadsheet jockeys can use a table view that works much like Excel's. You can also enter information in standard data-entry forms or in PERT or Gantt charts.

Project's multiple data-entry options smooth the transition for users switching from other project-management tools. The program supports forward and backward scheduling as well as WBS (work-break-down structure) assignments.

Project also offers the advantage of a batch updating capability that simplifies data entry and tracking by allowing you to process multiple contiguous or non-contiguous tasks simultaneously.

Like MacProject, Microsoft Project supplies a manual method for adjusting resource allocation as well as a resource-

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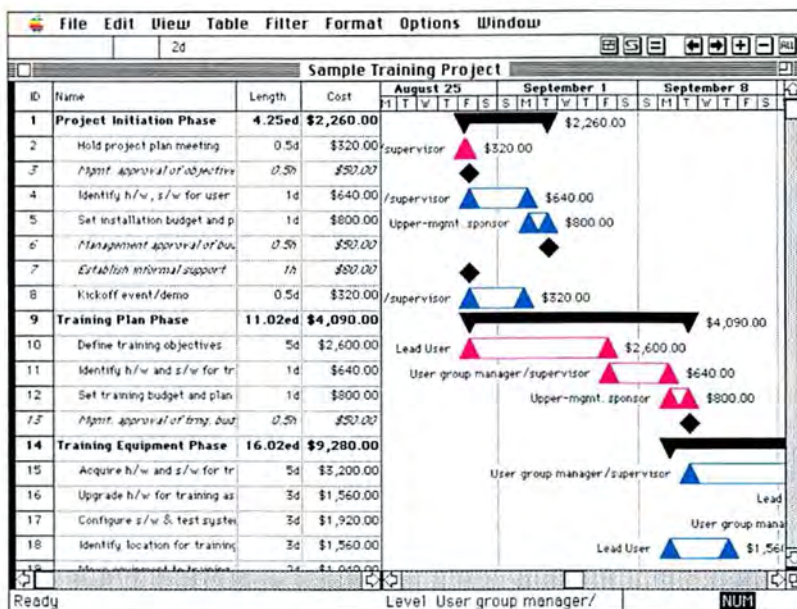
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AEC
SOFTWARE



A chief strength of Microsoft Project is its ability to provide customized views of project-management data, such as the costing and scheduling information shown here. However, experienced Mac users may have a hard time getting used to its Windows-like interface.

leveling routine that automatically adjusts task durations when resources are overallocated. The latter is especially useful for projects that are too complex for manual adjustment. Unlike MacProject, however, Microsoft Project doesn't provide interactive resource leveling, a feature that provides recommendations for resource leveling but leaves the final decision to the user.

To allow project managers to view project data in a variety of ways and at various levels of detail, Microsoft Project provides excellent support for custom tables and filters. Any data field can appear as a table. Custom filters let users specify what tasks and resources are to appear in a view. Project's extensive and well-designed filter editor allows you to create an almost limitless variety of custom reports.

Presentation-quality output is another of Project's strengths. The program lets you select colors, symbols, patterns, and custom bars for charts as well as manipulate border styles, fonts, and shading.

It's a graphics program. It's a business program. Is not.

The advertisement features three overlapping covers. On the left is the cover of 'SURF' magazine, showing a surfer riding a wave. In the center is a document titled 'Technical Production Procedures', which includes a hierarchical organizational chart with names like Robert Kessler, Rick Long, Barbara Nelson, and others, organized into three teams. On the right is the cover of 'VISION MAGAZINE', featuring a stylized portrait of a person with glasses and text like 'A NEW PERSPECTIVE ON LIFE', 'EASTERN TRAVEL', and 'FASHIONS OF THE FUTURE'.

Furthermore, Project provides several specialized cost- and schedule-reporting options that are not found in MacProject, including earned-value analysis, variance analysis, overtime, and variable-costs accrual.

Project's outlining capabilities are a boon for organizing projects in hierarchical levels that identify summary and subordinate tasks. By collapsing and expanding summary tasks, users can create reports that show different levels of detail.

Avoid the Clutter

Despite these impressive credentials, however, Microsoft Project's lack of regard for standard Mac interface conventions makes it a less than intuitive program. Unlike Claris' tool, Project is limited to a single window that acts as the portal to all project information. It's possible to split the screen into two different views of a project's data, but Project doesn't provide individual windows for each function (such as PERT and Gantt charts), as does MacProject.

Project's single split-screen approach frequently results in a cluttered display, especially on small monitors.

Another annoying characteristic involves units of measure for items such as standard and overtime rates. Choices for these items do not exist in forms or tables. Rather, you must enter rates as \$40/h (40 dollars per hour). Also revealing Project's DOS-based heritage, the half-time resource allocation requires you to type [.05] after resource names. These conventions are consistent throughout the product and are easy to get used to, but that doesn't make them any less frustrating. Subproject links are another problem: You must type them from memory, using full pathnames. There's no link command that displays a standard file dialog box containing a handy list of eligible files, as there is with MacProject.

The Bottom Line

Microsoft Project is a powerful project-management tool brimming with features. Professional project managers looking

for a way to tune the scheduling process to a fine degree as well as create a wide variety of custom reports will find Microsoft Project to their liking. For shops in which PCs are predominant and Project's Windows-based sibling is firmly entrenched, the Mac version will be a snug fit. But for the majority of Mac users, who rely on standard operating conventions for their applications, the program's non-standard interface is likely to be a decided disadvantage.

— Daniel W. Rasmus

Get Info

Microsoft Project

\$\$\$½

Published by: Microsoft Corp.,
One Microsoft Way, Redmond,
WA 98052; (206) 882-8080.

Version: 1.1.

List Price: \$695.

Is so.

Is not.

Is so.



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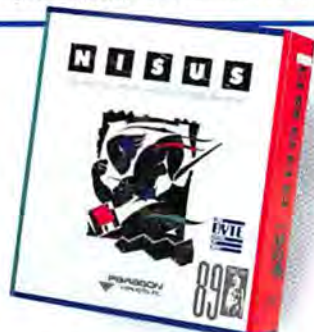
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8171 **TypeAlign for ATM 1.0.4** 62.
6644 **Adobe TypeSets for Business** ea. 95.
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4145 **Adobe Photoshop 2.0** 549.
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6674 **Aldus Personal Press 1.01** 195.
3506 **Aldus SuperPaint 3.0** 133.
3980 **Aldus Digital Darkroom 2.0** 259.
3507 **Aldus Super 3D 2.5** 325.
7467 **Aldus PrePrint 1.5** 325.
4751 **Aldus Persuasion 2.0** 325.
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9806 **Metamorphosis Pro 2.01** 89.
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1983 **EPS Exchange 1.0** 89.
★ **Ares Software ... 30 day MBG**
8878 **FontMonger 1.05** 62.
★ **Baseline Publishing ... 30 day MBG**
8055 **Screenshot 1.2** 34.
Bitstream
True Type Fonts 1 or 2 59. **3 or 4** 98.
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3572 **Kid Pix 1.2** 34.
1427 **The Print Shop 1.3.2** 35.
6281 **TypeStyler 2.0 (w/ATM, Dec. '91)** 127.
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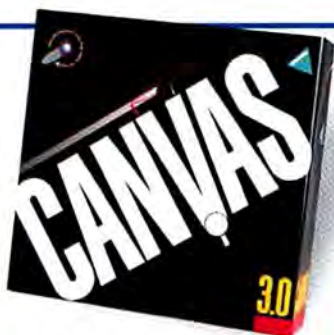
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3558 **DeltaGraph Pro (Nov. '91)** 189.
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3450 **SwivelMan 569. 3440 QuickPICS 94.**
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7773 **Stratavision 3D 2.0** 629.
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6379 **Accents & Borders I** 64.
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7115 **Publish It! Easy 2.12 w/File-It!** 154.
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9807 **DiskExpress II 2.07** 49.
9886 **MultiDisk 1.27** 49.
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8561 ⑦ 911 Utilities . . . 89.
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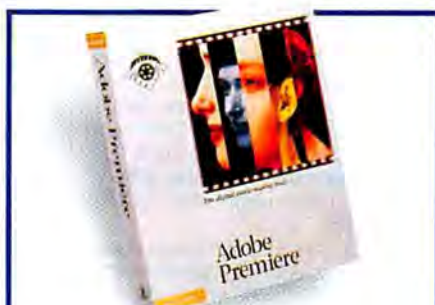
- 6667 ⑦ Prograph 2.5 (Dec. '91) . . . 309.

Visionary Software

- 3889 ⑦ Lifeguard 1.0.2 . . . 35.
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- 6516 The Playroom (CP) (color, Oct. '91) . 29.
- Carolyn Sandiego Series (CP) ea. 29.
- 6384 PlayMaker Football (color, Oct. '91) 29.
- 9804 RoboSport or 8195 BannerMania 35.
- 3559 SimAnt or 3562 Patton Strikes Back 35.
- 8266 SimEarth 1.0 40.
- 4966 SimCity (CP) 29. 5871 Supreme 47.
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- 7495 Mission Starlight or 7498 Sky Shad. 29.
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- 8525 Casino Master (B&W) 41. 8524 (Color) 45.
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Electronic Arts
1303 **Loom 1.0** 29.
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8643 **Harpoon or 1907 PGA Golf** ea. 39.
2962 **Harpoon Challenger Pak.** 59.
3385 **Secret of the Silver Blades** 39.
FTL/Software Heaven
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★ **Mysterium Tremendum ... 30 day MBG**
5841 **Moriarty's Revenge 1.03** 32.

★ **Nordic Software ... 30 day MBG**
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4087 **Christmas Pack 1.0** 30.

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VocabuLearn/ce Levels I & II
(French, Italian, Spanish, German, Russian, Hebrew, & Japanese) ea. 35.
PICTURE-IT! (French, Italian, Spanish and German)) ea. 40.

★ **Personal Training Sys. ... 60 day MBG**
Over 60 learning levels from beginner to advanced for System 7, QuarkXPress, Persuasion, FileMaker II/Pro, PageMaker, Illustrator, FreeHand, Word, HyperCard, Excel, & the Mac ea. 50.

Postcraft International
6466 **Citadel 1.21** 26.

Sierra On-Line
Space Quest III or IV ea. 34.
2523 **King's Quest V** (Nov. '91) 34.

Sir-Tech Software
8229 **Bane of Cosmic Forge (w/hints)** 35.

★ **Softstream ... 30 day MBG**
3501 **Classic Trilogy (cribbage, etc.)** (Dec.) 50.
3472 **Family Card Games** (Dec. '91) 50.

Software Toolworks
4619 **Mavis Beacon Typing 1.3 (CP)** 32.
1908 **World Atlas 1.0** 52.

★ **Spectrum Holobyte ... 30 day MBG**
3464 **Tetris 1.3 or 6112 Welltris 1.1** ea. 22.



Mallard Software

Scenery Upgrades—Microsoft Flight Simulator 4.0—Adds detailed high-quality scenery & graphics to Microsoft's latest version of Flight Simulator. Areas covered include the East Coast, Midwest, Japan, Europe & Hawaii ea. \$30.

3017 **Wordtris 1.0 or 8180 Faces 1.0** ea. 25.
3459 **Falcon 2.2.1 or 8181 Vette 1.0** ea. 33.

★ **Spinnaker ... 30 day MBG**
2328 **Sargon IV 1.03 (CP) (chess)** 28.

★ **Strategic Studies ... 30 day MBG**
3287 **Warlords (empires at war)** 31.

StudyWare
ACT, GMAT, GRE, or SAT Prep ea. 29.

8098 **LSAT Prep for the Mac 3.7** 35.

Terrace Software
8192 **Mum's The Word 1.1A (gardening)** 79.

★ **Toyogo ... 30 day MBG**
7836 **Nemesis Go Junior 5.0** 19.
7624 **Nemesis Go Master 5.0** 35.

2471 **Nemesis Deluxe Toolkit 5.0** 69.

★ **XOR ... 30 day MBG**
8061 **MacSki 39. 6040 MacGolf Classic** 52.
3815 **NFL Challenge 1.03** 55.



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2198 **More After Dark (M.A.D.)**—25 new displays for After Dark. Featuring Mowin' Man, Tunnel, Crazy Kittens, Art Museum \$23.
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To get weekend



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MacInTax Personal States 1991 ea. 42.

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MacConnection is the exclusive mail-order reseller for Outbound Notebook Systems.

Outbound Systems, Inc.

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- 4167 ⑦ Outbound Notebook 2000/440 (68000, 4 MB, 1.4 Floppy, 40 HD) 2999.
- 4169 ⑦ Outbound Notebook 2030/440 (68ec030, 4 MB, 1.4 Floppy, 40 HD) 3399.
- 4170 ⑦ Outbound Notebook 2030/441 (same as 2030/440, incl. math copro) 3449.
- 4172 ⑦ Outbound Notebook 2030/460 (68ec030, 4 MB, 1.4 Floppy, 60 HD) 3699.
- 4174 ⑦ Outbound Notebook 2030/461 (same as 2030/460, incl. math copro) 3749.

COMMUNICATIONS

MODEMS, MAIL, NETWORKS

- ★ **Abaton ... 30 day MBG**
- 6266 InterFax 24/96 Modem 299.
- 2724 InterFax 24/96 w/InterShare 349.
- ★ **Applied Engineering ... 30 day MBG**
- 8362 ⑦ QuadraLink (w/AE Shadow) 205.
- ★ **Argosy Software ... 30 day MBG**
- 7872 ⑦ Software Bridge/Mac 2.0.1 99.
- 2448 ⑦ RunPC/Network 279.
- ★ **CE Software ... 60 day MBG**
- 8066 ⑦ QuickMail 2.5 (5) 249. 8067 (10) 375.
- ★ **CompuServe ... 60 day MBG**
- 1676 ⑦ Macintosh Membership Kit 1.5 .. 25.
- 1673 ⑦ CompuServe Navigator 3.04 49.
- 1674 ⑦ Membership Kit/Navigator Bundle 72.
- ★ **DataViz ... 60 day MBG**
- 1823 ⑦ MacLink Plus/PC 6.0 (Nov. '91) .. 129.
- 4842 ⑦ MacLink Plus/Translators 6.0 (Nov.) 109.
- ★ **Dayna ... 60 day MBG**
- DaynaPORT E: (10BASE-T) ea. 209.
- DaynaPORT E: SE, SE/30, II, IIsi, LC 229.
- 8719 EtherPrint or 9888 (10BASE-T) ea. 349.

Dove Computer

- 6758 ⑦ DoveFax 2.0 289. 3352 NuBus \$329.
- 9634 ⑦ DoveFax Plus 349. 4111 NuBus 399.
- 4110 ⑦ DoveFax LAN 499. 4109 NuBus 529.

★ Farallon Computing ... 30 day MBG

Full line available. Partial listing.

- 9805 ⑦ Timbuktu 4.0.2 135.
- 4866 ⑦ Timbuktu/Remote 3.0 135.
- 9961 PhoneNET Card PC 209.
- 6273 PhoneNET StarConnector 10-Pack. 129.
- 4869 PhoneNET Connector 10-Pk (DIN8) 198.
- 2206 PhoneNET StarController 300 899.

★ Freesoft ... 60 day MBG

- 6115 ⑦ White Knight 11 85.

★ Global Village ... 30 day MBG

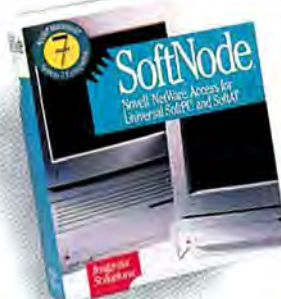
- 8946 ⑦ TelePort A300 139.
- 8945 ⑦ TelePort/FAX 185.

Hayes

- 2300 ⑦ Smartcom II 3.3. 84.
- 8614 Personal Modem 2400 Plus 149.
- 7391 ULTRA 96 Modem 669.

Insignia Solutions

- 7557 ⑦ Access PC 1.1. 60.
- 9726 ⑦ Entry Level SoftPC 2.5. 125.
- 4089 ⑦ Universal SoftPC 2.5 195.



★ Insignia Solutions

3441 ⑦ **SoftNode 1.0**—Add SoftNode to SoftPC, and your Mac can not only run MS-DOS applications, it can also share programs over a Novel PC Network! Your next PC could be a Macintosh \$105.

- 3229 ⑦ SoftAT 2.5 299.
- 3441 ⑦ SoftNode 1.0 105. 3454 (10 Pak) 699.

Intel Corporation

- 5119 2400EX Modem 169. 6420 (MNP) 225.

★ Microcom ... 30 day MBG

- 7459 ⑦ CarbonCopy Mac 2.0 (single) ... 59.
- 1556 ⑦ CarbonCopy Mac 2.0 (unlimited) 179.

★ Nuvotech ... 60 day MBG

- 3000 TurboNet ST (DIN8) 29. 6751 (12 Pak) 279.

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- 2392 Orange386 (20 MHz) 1799.

★ Practical Peripherals ... 30 day MBG

- 8994 2400 V.42 bis Modem 199.
- 7934 PM9600SA Modem 1.26 469.
- 9849 SmartPack 9600 (w/Smartcom II) .. 529.

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- 2590 ProModem 2400 Mini Plus 129.
- 3832 ProModem Remote Plus. 249.
- 3232 ProModem 24/96 S/R Minifax Plus 269.
- 8990 ProModem Ultima 689.
- 3831 ProModem 9600M-EC 499.

PSI Integration, Inc.

- 3143 COMstation 1 285. 3142 COM 2 379.



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9634 ⑦ **DoveFax Plus 2.0**—Now System 7 compatible! Combines 3 popular office machines into one small package. 2400 bps modem/9600 bps send/receive fax will also answer your phone and allow users to leave voice mail. \$349.

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- 3444 ⑦ NetSerial 275.
- 4347 NetBridge or 4942 ⑦ TeleBridge. . 409.

Sitka/TOPS

- 4188 Teleconnector (DIN8) 23. 2230 (10) 189.
- 6264 ⑦ TOPS Network 3.1 187.

★ Software Ventures ... 30 day MBG

- 3455 ⑦ MicroPhone II 3.0 (free upgrd. 4.0) 215.

★ Synergy ... 30 day MBG

- 6618 ⑦ VersaTerm 4.5 90. 6619 PRO 3.5.1 177.

★ Tactic Software ... 30 day MBG

- 2996 ⑦ Traffic Controller Personal 1.0 ... 65.

★ Technology Works ... 30 day MBG

- 1582 ⑦ GraceLAN 295. 1584 Corporate 719.
- 1583 ⑦ GraceLAN 50 Node Upgrade .. 119.

★ White Pine Software ... 30 day MBG

- 3539 ⑦ Mac 220. 89. 3535 Mac 240. 139.
- 3541 ⑦ Mac 241 or 3544 Exodus. . ea. 199.

★ Zoom Telephonics ... 30 day MBG

- 1168 MX2400R Modem (w/QuickLink II) 69.
- 1176 MX2400S Modem (w/SendFax 9600) 79.
- 2310 FX9624 Send/receive Fax/Modem 119.
- 3576 FX9624V Send/receive Fax/Modem 169.
- 1179 V.42bis Modem (w/MacPack) 139.
- 2311 V.32 Turbo Modem (w/MacPack) .. 419.



★ Symantec ... 30 day MBG

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- Sigma Designs**
- 1501 DoubleUp with ⑦ DiskDoubler 3.7 179.
- ★Total Systems ... 30 day MBG**
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 - 7816 20 MHz Gemini 030 799.
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- ★Fuji ... 60 day MBG**
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 - 2215 3 1/2" HD Disks (10) \$15. 2241 (50) \$69.
 - 2243 3 1/2" Color (10) DS . 10. 2239 HD . 18.
- ★Sony ... 60 day MBG**
- 3297 3 1/2" DS Disks (10) 9. 6148 (30) 25.
 - 3298 3 1/2" HD Disks (10) 16. 6375 (30) 45.
 - 1603 DG60M... 16. 2520 DG90M... 27.
- ★SyQuest ... 60 day MBG**
- 6592 44 MB Cartridge 72. 9728 (10) 689.

ACCESSORIES

TONERS, CASES, DUST COVERS

- Apple Computer**
- 7748 Personal LaserWriter Toner Cart. 89.
 - 1115 LaserWriter II Toner Cartridge 105.
- ★Avery ... 60 day MBG**
- 4807 Laser Labels 1" x 2 3/8" (Qty. 3000) . 24.
 - 5392 Disk Labels 3 1/2" Laser (Qty. 630) . 29.
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7129 ⑦ Accountant, Inc. 2.1.2—Comprehensive, fully-integrated accounting software that includes General Ledger, Receivables, Payables, Inventory, Invoicing, Payroll, Check Writing & more \$339.
3828 ⑦ Accountant, Inc./Multiuser 569.

- CoStar**
- 6091 The Organizer 189.
 - 7453 The Organizer Jr. 82.
- ★Curtis Manufacturing ... 30 day MBG**
- 8046 MVP Mouse (MVP-1) 89.
- ★Goldstein & Blair ... 30 day MBG**
- 8374 ⑦ The Macintosh Bible (with disks) . 25.
- IDG Books**
- 2238 Macworld Guide to System 7 Book . 19.
- ★I/O Design ... 30 day MBG**
- 8812 Ultimate Classic Carrying Case. 64.
 - 3371 Ultimate PowerBook Carrying Case 79.
 - 1941 Ultimate LC Carrying Case 95.
- ★Kensington ... 30 day MBG**
 Full line available. Partial listing.
- 4973 Power Tree 20 27.
 - 2559 Apple Security Kit 33.
 - 9303 Keyboard Shelf 39.
 - 6763 SE Radiation/Anti-Glare Filter 52.
 - 5064 Apple Color Monitor Polarizing Filter 63.
- ★MacConnection ... 60 day MBG**
- 1505 Oak Disk Case (36) 21. 4623 (90) 32.
- ★Moustrak ... 60 day MBG**
- 2694 Moustrak Pad (7"x9") 8. 2692 (9"x11") 9.
 - 2693 Moustrak Pad Low Friction (9"x11") . 10.



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 Experience a new world of LC speed with TransWarp LC. At 33 MHz you'll get up to three times the speed of the standard LC.
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- ★Targus ... 60 day MBG**
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 - 4015 Mac SE & Ext. Kybd. Carry Case .. 75.

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- 2742 Scan 300/Color (reqs. install. kit) . 1149.
- 1496 Int. Kit for 300/Color w/Photoshop . 479.
- 1537 LaserScript LX . 1729.

★ Advanced Gravis ... 30 day MBG

- 9963 Gravis Mouse Stick . 59.
- 9964 Gravis Super Mouse . 79.

American Power

- 5895 UPS 110SE 209. 6686 UPS 370ci 339.
- 3447 SurgeArrest Plus. . 39.

Caere

- 8124 Typist Plus Graphics . 479.
- 4476 OmniPage 3.0 . 495.

CoStar Corp.

- 1884 LabelWriter II . 193.
- 1418 AddressWriter (Dec. '91) . 499.
- Stringray ADB (platinum or black). 89.

★ Datadesk ... 30 day MBG

- 9830 MAC101E 129. 2384 w/QuickKeys 149.
- 6901 Switchboard (modular keyboard) . 159.



★ Prometheus ... 30 day MBG

3832 Pro/Modem Remote Plus—Pocket-sized, battery operated 2400 bps data/9600 bps send/receive fax modem for easy, on-the-road faxing. Supports MNP 5/V.42 protocols; includes MacKNOWLEDGE & Maxfax 3.0 ... \$249.

★ Everex ... 30 day MBG

- 1144 Silhouette Trackball 1.0 . 82.

GDT Software

- 3429 BetterWriters 1.0 (software drivers) 39.
- 6256 PrintLink Collection/Serial 4.0.1 . 59.
- 6151 JetLink Express/Serial 2.1 . 89.

Hewlett-Packard

- 6514 HP DeskWriter (incl. cartridge) . 479.
- 2964 HP DeskWriter (color, incl. cart.) . 849.
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- 6754 HP LaserJet III (w/toner, reqs. kit) 1679.
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Koala

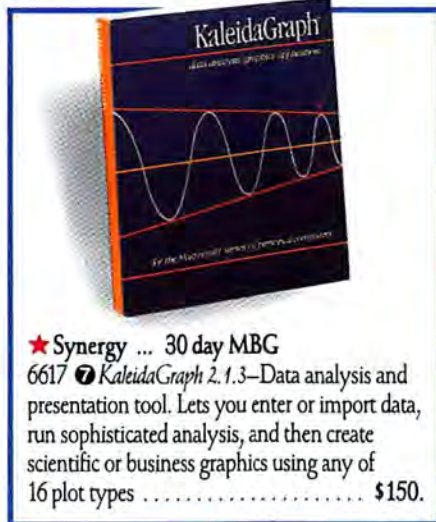
- 2879 MacVision 1.1 (color) . 499.

★ Logitech ... 30 day MBG

- 1671 MouseMan . 77.
- 5082 ScanMan Model 32 G-Scale Scan. 299.

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6617 KaleidaGraph 2.1.3—Data analysis and presentation tool. Lets you enter or import data, run sophisticated analysis, and then create scientific or business graphics using any of 16 plot types . . . \$150.

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- 1486 MacSpeakers (two, stereo) . 169.

★ Mouse Systems ... 30 day MBG

- 3005 A³ Trackball (ADB) . 79.
- Little Mouse or Little Mouse Plus 74.

★ Nutmeg Systems ... 30 day MBG

- 19" for SE, SE/30, II, IIsi . ea. 995.
- 19" for GrayScale SE/30, II, IIsi . ea. 1295.
- 20" Color System: SE/30, II, IIsi ea. 2595.

★ Orange Micro ... 30 day MBG

- 3036 Grappler 2.0 . 92. 6229 LX . 111.

★ Sophisticated Circuits ... 30 day MBG

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- 8008 PowerKey Remote. . 32.

★ SuperMac Tech. ... 30 day MBG

- 4139 Monochrome Card (NuBus only) . 349.
- 4134 19" Gray-Scale/Mono Display. . 999.
- 1805 19" SuperMatch Color Display . 1999.



★ Nutmeg Systems ... 30 day MBG

19" Gray-Scale Display for SE/30, II or IIsi—Delivers a flicker-free 72 dpi image at 78 MHz with 256 shades of gray. Includes video card, tilt/swivel base and anti-glare screen. Please see line listings for additional Nutmeg products. . . ea. \$1295.

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- 8361 1.44 MB High Density Drive 229.
- 2532 QuickSilver (32K cache card) 309.
- 3319 TransWarp SE w/FPU (25 MHz) 829.
- 3317 TransWarp SE w/FPU (40 MHz) 1499.
- 4146 TransWarp LC. 829. 4147 w/FPU. 999.

Computer Care

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- 3401 FastCache IIsi 299. 3389 w/FPU 369.
- 40 MHz PowerCache for SE/30, II, IIsi, IIsi, LC . 899.
- 50 MHz PowerCache for SE/30, II, IIsi, IIsi, LC . 1399.
- 3584 DualPort IIsi w/20 MHz 68882 165.

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- 2333 Hammer Int. 100is 599. 2334 HI200is 999.

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- 2467 Gold Std. Rem. Disk (90 MB, tri-pak) 439.

Mass Microsystems

- 2605 DataPak 45 649. 2599 DataPak 88 899.
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NEW ON THE MENU QUICK CLICKS

QUICK CLICKS



As its name implies, TopDown is a tool for creating charts and diagrams that illustrate procedures, flowcharts, and business plans from the top down. The new version, 3.0, includes enhanced tools for connecting chart symbols, a text-file import capability, and color support for text.

TopDown charts document the relationships between data and process, input and output, and knowledge and decision. Custom symbols and other graphics tools let you enhance the diagrams and charts you create with TopDown for presentation-level output or for use in documentation.

Creating TopDown charts is easy. You simply select a symbol from the palette and click on the chart to place the symbol. A flashing cursor lets you enter text to label your graphic. TopDown comes with a complete set of ANSI flowchart symbols, Yourdon-style data-flow diagram symbols, and a custom set of symbols that combines business icons with text boxes. The program also supplies 48 symbol holders for user-defined symbols, including EPS-format graphics. Each symbol in TopDown is numbered to define its logical place in the chart, although you can opt to hide the numbers.

Two of TopDown's most useful features are note cards and clusters. Note cards let you attach individual text documents to a symbol, so you can explain a process or document the symbol. They can contain up to 32K of text.

The Cluster function lets you simplify a complex diagram by replacing a group of symbols with a single replacement symbol, thereby reducing the diagram's level of detail. The subgroup of symbols underlying the replacement symbol can be moved to a newly created lower-level drawing. Connecting lines automatically reconnect to the replacement symbol.

TopDown 3.0 also includes a variety of node connectors for developing network diagrams. Nodes illustrate line crossovers, or hubs, in local-area networks. But TopDown's primary function is creating charts for systems analysts and information consultants. For software design, at \$345, it's priced well below dedicated CASE tools. The program's ease of use and variety of symbols also make it a good

choice for more-general business diagrams such as business plans, procedures, and org charts.

However, the overall quality of the charts and diagrams you create with TopDown is not on a par with those of competitor MacFlow, from Mainstay. The appearance of TopDown documents can easily become cluttered, because symbols must always appear separately from the text that describes them. By contrast, MacFlow symbols can contain text, making for a cleaner-looking layout. In addition, MacFlow provides a Bézier tool for creating curved connecting lines.

On the other hand, if you require extensive reporting capabilities, TopDown is a better choice than MacFlow, which lacks any kind of reporting function. TopDown's Outline report lists all of a chart's symbols with corresponding text, a Cross Reference report documents attached symbols, and an Errors report documents symbols that show data in but no data out (an important feature for users who create data-flow diagrams).

Kaetron Software, 12777 Jones Road, Suite 445, Houston, TX 77070; (713) 890-3434. Version 3.0. \$345.

— Daniel W. Rasmus



ProfitAbility Professional, a single-entry bookkeeping system with an emphasis on ease of use and reporting, is an ideal choice for small businesses looking for a do-it-yourself time-and-billing package. In a nutshell, ProfitAbility Pro is designed for those who can't make head or tail of the methods conventional accounting packages use.

By taking summary-level accounting information and executing a few simple additions, subtractions, and divisions, the HyperCard-based ProfitAbility Pro provides a nicely formatted snapshot of a business's financial health. The latest version, 1.4, is System 7-compatible and comes with version 2.1 of HyperCard for installation.

To get you started, ProfitAbility Pro provides a straightforward set of entry screens that makes data input a snap. The program's Home screen provides a flash report that displays such topical business information as year-to-date balances,



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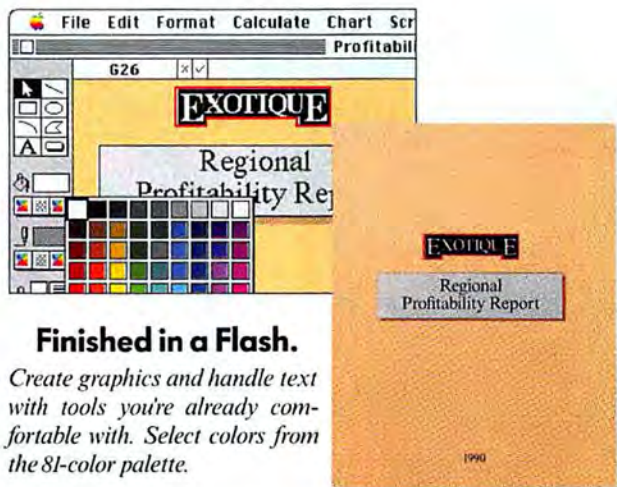
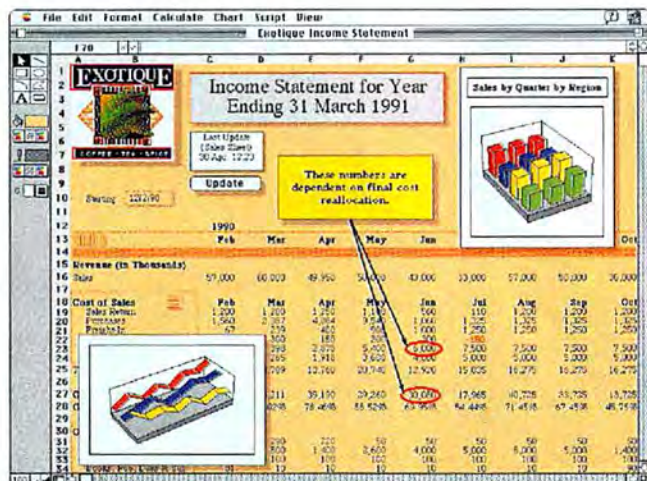
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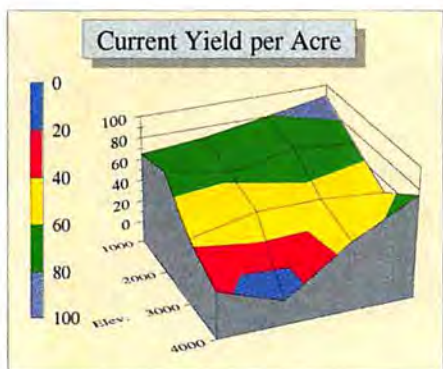
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SUGGESTED RETAIL

receivables, gross billings, and cash flow.

Navigation through the program is handled by The Manager, a point-and-click system controller. The Manager enables you to quickly archive, export, and update information as well as control the program in concert with the menu system.

In addition to its flash report, ProfitAbility Pro generates a P&L statement that includes a balance sheet, a capital statement, and percentage calculations by line item.

To track cash outflows, the program monitors disbursements in a sequential Disbursements Journal. The flip side, the Receipts Journal, tracks incoming cash in the same way. The look and feel of these two journals is much like that of a spreadsheet: Information in them is presented in a row-and-column format.

The general-ledger section of the system uses account cards modeled after traditional paper-based one-write accounting systems. The account cards form the heart of ProfitAbility Pro. Mapped throughout the program by the chart of accounts, they hold all the information necessary to determine assets or liabilities, revenue, and expense items. The cards can also track information by profit center.

ProfitAbility Pro can enter recurring checks automatically as well as batch-print them. Once a check series has been established, the system automatically tracks check numbers and updates its Disbursements Journal. You perform bank reconciliations by checking off each negotiated check with a *c* in the Disbursements Journal.

The Estimate and Invoice module of ProfitAbility Pro generates invoices and creates estimates for prospective customers. The Goods and Services window gives you a quick look at your inventory, and a series of worksheets lets you track and analyze time-and-materials invoices for project-driven work.

ProfitAbility Pro can also generate payrolls. The system automatically deducts federal tax, FICA, and Medicare withholding. State taxes are entered directly into the system. In addition, the Sales Journal is driven by the invoices you generate. The Sales Journal provides a complete history of all your revenue activity. Two other pluses for small businesses are ProfitAbility Pro's built-in phone-and-mailing list and daily planner.

ProfitAbility Pro is an interesting product. It's the first commercially distributed accounting package available that runs in

HyperCard. The look and feel of HyperCard are the look and feel of ProfitAbility Pro. Although the program's functionality is rich, the trade-off is that the system can handle only plain-vanilla businesses. If your business involves complex accruals or requires different management- and tax-reporting books (as do partnerships, for example), ProfitAbility Pro is not for you. As a mom-and-pop cash-accounting system, however, it's a solid investment. Wetzel & Co., Inc., 147 E. Rocks Road, Norwalk, CT 06851; (203) 846-2504. Version 1.4. \$249.

— Ken Landis



Programs are not supposed to be named after their authors — Peter Norton and Andrew Tobias notwithstanding. It's one of those unwritten rules of software design. So you expect a program named Michael's Draw to be different. And it is.

Touted as a combination object-oriented drawing and image-synthesis program, Michael's Draw breaks new ground and a good many rules. It sets out to outfeature the competition while selling at half the price. Brimming with features, Michael's Draw is unquestionably a one-man tour de force, and Michael himself handles all technical-support calls. Based on our experience with the program, he must be a busy man.

As an object-oriented drawing program, Michael's Draw has its roots in MacDraw and FreeHand. Although it lacks FreeHand's innovative Layer palette, it boasts plenty of other palettes plus more control over a virtually unlimited number of named layers.

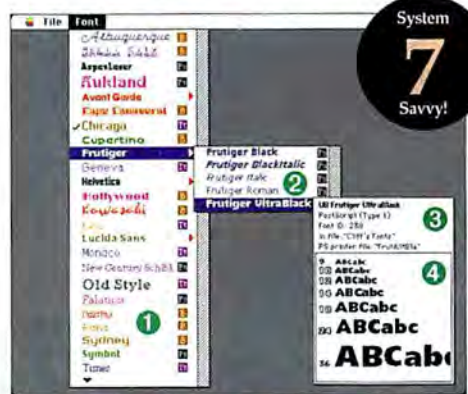
The program's text manipulation is also impressive, with flow commands that let you fill polygons with text, much as you can with Illustrator 3.0. You can bind text to any polygon, rotate text on-screen, and perform almost all standard font formatting from a single floating palette.

Graphic objects are predictably loaded with options. You can create regular polygons (from triangles to dodecagons) and select one of three line styles. The program includes more built-in patterns than Carter has pills, and you can choose a different color for the black and white bits in lines or fills that use a black-and-white pattern.

The Michael's Draw feature list could

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go on and on. The long list makes Michael's Draw a serious contender as a drawing program, on a strictly feature-by-feature basis. Amazingly, however, the checklist doesn't stop there. The program is also a full-blown image processor equipped with many of the features of Photoshop, Digital Darkroom, and Studio/8. The difference is that Photoshop typically uses a scanned image for processing whereas Michael's Draw uses draw objects. To achieve the sophisticated effects of fusing, blending, noise, anti-aliasing, dithering, and masking, Michael's Draw offers a full scripting language for image processing.

The caveat, however, is that all these innovative features come at a price. The image-processing techniques are confusing at best and incomprehensible at worst. Michael's Draw stumbles badly in its user-interface implementation. Commands are badly named and hard to find. Worse yet, some techniques require nonintuitive use of dialog boxes and commands.

The program's documentation consists of one manual, a printed version of the on-line tutorials. Unfortunately, considering the program's quirky interface and confusing terminology, you'll need far more than the manual to master Michael's Draw. On the other hand, if you love a challenge, enjoy exploring a treasure trove of features, and don't mind nonstandard techniques for accomplishing highly unusual drawing tasks, Michael's Draw may have your name written all over it.

Event One, 222 Del Norte Avenue, Sunnyvale, CA 94086; (408) 734-4358. Version 1.0. \$149.99.

— Dave Valiulis

Railroad Tycoon

If the sound of a train whistle sends thrills up your spine, MicroProse Software has the program for you. Railroad Tycoon, a best-selling simulation game in the DOS world, Railroad Tycoon has finally made it to the Macintosh. With the exception of a few quirks that stem from its DOS roots, Railroad Tycoon is a wonderful game that quickly becomes addictive.

As you've probably guessed, the primary action in Railroad Tycoon revolves around building trains, schedules, and stations as well as laying the miles of track

needed to run the trains. The game provides an excellent simulation environment that includes natural objects such as trees and mountains as well as cities and a wide variety of geographic and time options. The environment generator creates a new situation for each simulation. New York may be a major city in one, for example, and a sleepy village in the next.

Not surprisingly, train building is one of the game's most detailed actions. You can choose engines based on historical availability and the needs of your railroad company. Detailed performance specs guide you in making wise choices. You can select from a wide variety of cars to string behind your engine, and you can tailor the performance of your trains to each particular environment. You can also choose to have the program control the trains, or you can control them manually.

Railroad Tycoon provides three computer opponents, who range from nice guy to vicious cutthroat. Like a bonafide tycoon, you can wheel and deal in railroad stocks, both your own and those of your competitors.

The game is best played in 256 colors (set the partition to 2,000K+, because the program doesn't launch with the default settings), because large-scale views use color codes to present important information. Railroad Tycoon supplies a host of wonderful sounds and great animation effects, including trains that chug along and whistle. These extras slow the action down, but you can turn them off if the lack of speed bothers you.

Railroad Tycoon's copy protection requires that you correctly identify 1 of 16 engines in order to play (all are shown in the manual). The documentation consists of a history of railroading and a small Mac-specific instruction booklet.

Railroad Tycoon's conversion from the DOS world to the Mac has introduced some idiosyncrasies. Many operations require mouse action as well as a keyboard command (with no menu equivalent).

Although Railroad Tycoon's interface flaws and poky performance can be annoying, they're easy to overlook in light of the game's overall brilliance. Owning the Shortline and Reading was never like this. If you like good simulation games or if you're a railroad buff, Railroad Tycoon is a great way to while away a lot of time.

MicroProse Software, 180 Lakefront Drive, Hunt Valley, MD 21030; (301) 771-1151. Version 1.055.01. \$69.95.

— Steven Bobker

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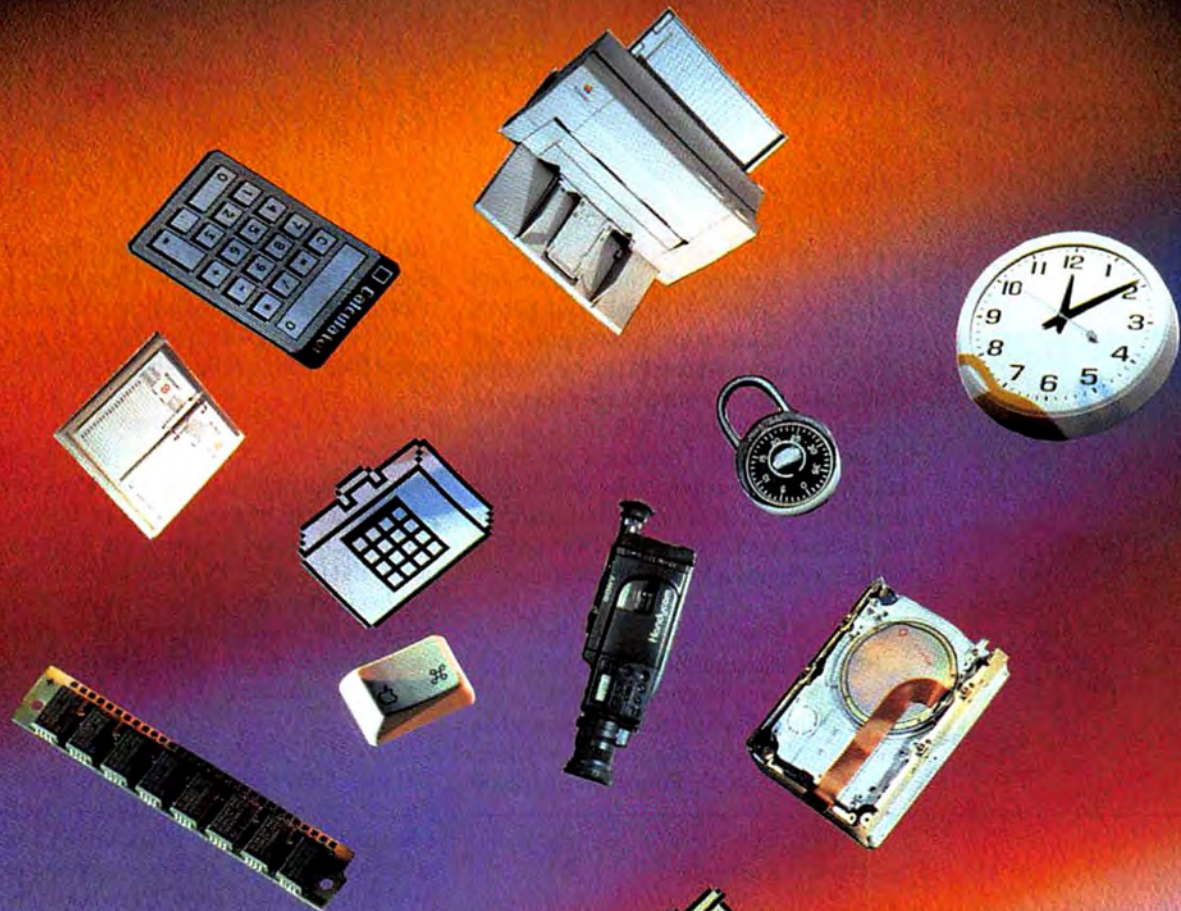
Apple crammed lots of new features — from aliases to virtual memory — into System 7. But what about the cool stuff it left out? Don't wait for Apple to catch up. Here are 50 ways to supercharge System 7 today.

The Ultimate System Folder

Some people just can't be satisfied. System 7 was a great leap forward for Apple. All kinds of new features were included for the first time, but a lot of great features were left out too. Just because cool stuff such as Desktop Printers (see item No. 35) dropped off Apple's list of System 7 features, it doesn't mean that you can't have them on *your* Mac.

Here are 50 ways to enhance your system beyond what the Apple engineers were able to deliver with 7. Many of the products listed here are shareware, freeware, or low-cost utilities. Lots of them are available as part of bundled packages (in which case the name of the entire package is indicated in parentheses). Installing most of them is no harder than dragging a file into your System Folder. Whether you adopt one or all of them, you and your Mac will be that much closer to system satisfaction.


BY BEN TEMPLIN



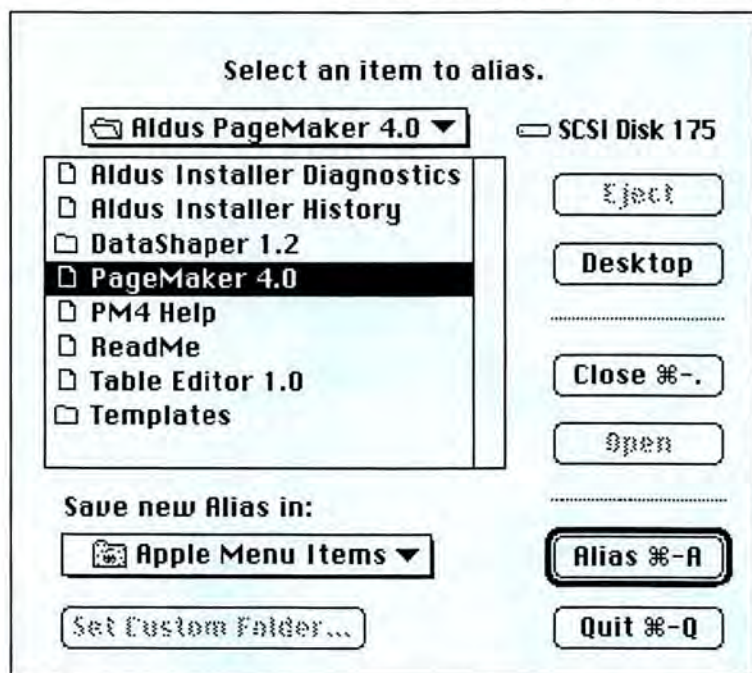
1. Mount DOS Disks

If you're anxiously waiting for the much ballyhooed "Pink" — Apple and IBM's operating system for the rest of them — get DOS Mounter or AccessPC in the interim. Each utility offers a simple solution to the problem of mounting DOS disks on the desktop. This control panel lets you ascertain which Mac applications will launch certain types of DOS documents based on the three-character extension DOS adds to a file. It requires a Mac FDHD drive.



2. Automate Your Aliases

Nearly a dozen utilities can create aliases. Here's a sampling of the coolest. AKA (Fred's Finder Hacks) creates an alias when you control-drag an icon to a new folder. MacUser's Nom de Plume, available on



2. Automate Your Aliases

Zmac, creates an alias and automatically puts it into common folders such as the Apple Menu Items folder. MacUser's ZMakeAlias creates aliases from within an application's Save and Save As dialog boxes.

3. Clean Up Alias Files

Making aliases is a lot easier than getting rid of them. When you trash a file, its alias remains. MacUser's Alias Assassin combs through your hard disk, searching for unattached aliases. A list displays the orphans,

and you have the option to delete them or reattach them to lost files. TrashAlias, a freeware extension, provides a more automated solution. When you throw away a parent file, the alias follows it into the Trash.

4. Load Extensions with Aliases

You're out of luck if you want aliases to load extensions that aren't kept in the System Folder, unless you have the freeware utility INITLoader. INITLoader even lets you load extensions across a network — a boon for network managers who want to keep every everyone up-to-date on virus-detection extensions.

5. Add Hierarchical Menus

Hierarchical menus create submenus so you can access tasks or items directly. With a hierarchical Chooser, for example, you save a step by going straight to a printer or AppleShare configuration. Three fine commercial solutions — HAM (Hierarchical Apple Menus), NowMenus (Now Utilities), and SuperMenu (HAND-Off II) — are all sturdy tools. HAM (in beta at press time) manages your Apple menu by re-ordering items and defining groups. SuperMenu displays submenus in different fonts and at different levels of hierarchy.

6. Launch Applications from Anywhere

System 7 lets you launch applications and documents from the Apple menu. HAND-Off II and MultiMaster (Now Utilities) let you launch files from anywhere on-screen through a pop-up menu. HAND-Off II also includes a powerful set of hot keys for launching documents and programs.

7. Control Your Windows

With a dozen windows open on your desktop, getting to the one at the bottom means a lot of shuffling. Instant Menus (QuickTools) has a Windows feature that lets you instantly bring any open window to the front. Kiwi Power Windows advances that concept by bringing any open window in any application to the foreground.

8. Get a List of Found Files

The System 7 Find command lacks one critical element — a list of found files.

Several programs (some old and some new) have stepped in to fill the void. Mr. File builds a list of found files from which you can launch, copy, and delete files. DiskTools and MasterFinder (File Director) are faster alternatives with more search criteria, such as by file size and modification date.

9. Get a List of Recently Opened Files

You usually don't realize that a file has been lost until you have the Open File dialog box on-screen. Shortcut and Super Boomerang (Now Utilities) build lists of commonly used files and folders so that you can easily "jump" to a different folder from within the Open and Save dialog boxes. Super Boomerang is the stronger utility, but it comes at a higher price, because it's grouped with other applications.

10. Search All Text on a Disk

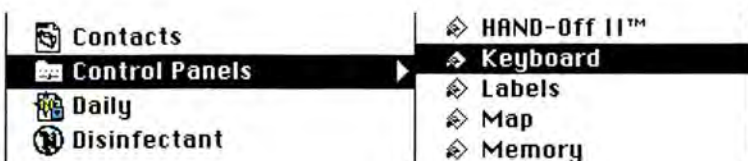
If you can't jog your memory for the filename you're after, you may need more-powerful search software—a text-retrieval program. Gofer and On Location are two heavyweight applications that can scan the contents of files for a string, word, or phrase. On Location preindexes your entire hard disk (or other mass-storage device) to make text retrieval nearly instantaneous. For the "lite" version of text retrieval, look at Super Boomerang (Now Utilities). You use its Find command to search through files for a string. Super Boomerang doesn't have the feature set of the other programs, but it still gets the job done.

11. Launch Files with Substitute Applications

One of the more annoying dialog boxes is "Application not found," which you get when you double-click on a file in the Finder for which you don't have the application. Jump Start, a shareware program, launches documents with a substitute program. For instance, it automatically launches MacWrite documents with Microsoft Word, or vice versa. HAND-Off II is the commercial alternative, and it adds a host of features—not the least of which is the ability to launch DOS documents.

12. Preview Graphics Files

The process of opening a graphic from



within a painting, drawing, or page-layout program can be time-consuming. Screen redraws and color files combine to make the process slow. Opening the wrong file is even more frustrating. PickTURE solves the problem by letting you preview thumbnail graphics from within the Open dialog box, which gives you an idea of what the image looks like.

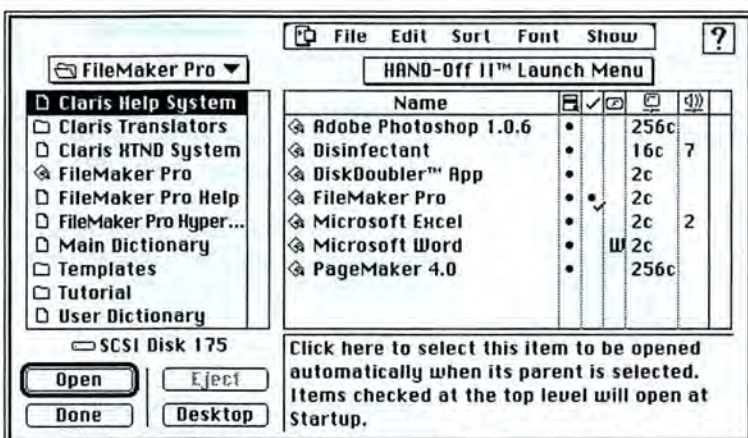
13. Create File Work Sets

If you want to open multiple documents simultaneously, get Out to Launch, a freeware Fkey that lets you define groups of documents of the same type to launch at one time. Kiwi Power Windows lets you define

5. Add Hierarchical Menus



11. Launch Files with Substitute Applications



"work sets" of multiple applications and documents that can be launched with one command. HAM (Hierarchical Apple Menu) has the ability to take snapshots of open documents and store them as a work set, which can be launched later. Tiles (still in beta at press time) is the most feature-laden application in this group. It manages dozens of work sets easily.

14. Instantly Access the Comment Field

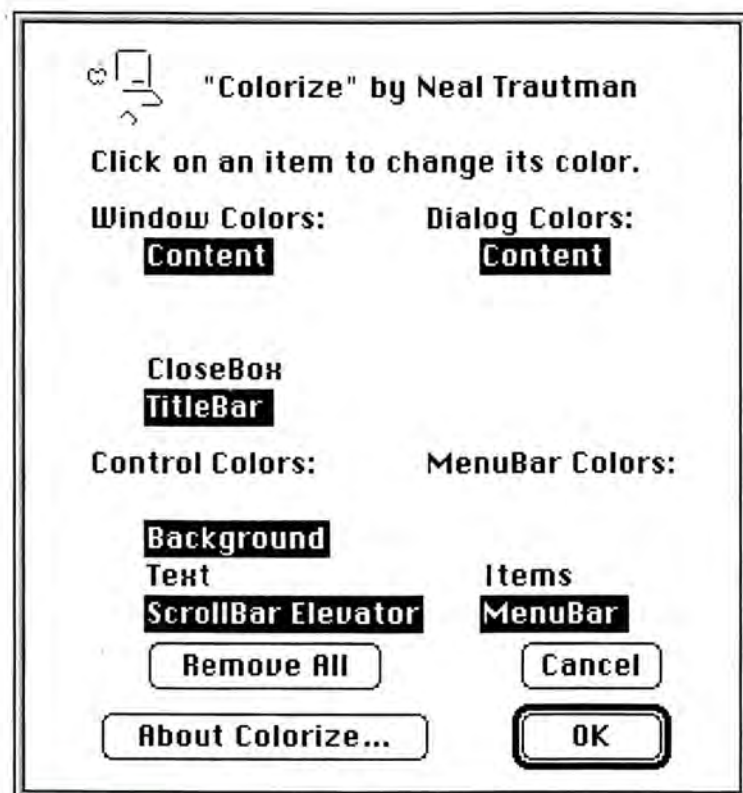
The Get Info box in the Finder lets you



QT/Dialog Power!



Suitecase™ II 2.0



20. Color Your Menus



Colorize 3.0



CClock

add comments to a file, but those comments are relatively useless unless you are in the habit of having dozens of Get Info boxes open. The freeware utility SFComment makes the comment field instantly accessible by displaying file comments in the Open dialog box of any application.

15. Mouseless Dialog Boxes

Keep your hands on the keyboard when dialog boxes pop up, with one of these three solutions. DialogKeys (QuicKeys 2) lets you cycle through buttons in a dialog box with Command-Tab. Dialog Power! (QuickTools) and the freeware extension Escapade assign a letter to a dialog-box button as the equivalent of a click. Dialog Power! also lets you cut, copy, and paste into any dialog box — very handy if you're transferring information.

16. Add Your Own Command-Key Shortcuts

Have you ever wanted a Command-key shortcut for Empty Trash or another Finder menu item that doesn't have one? The

shareware program Finder 7 Menus! allows you to choose a menu and define a key without having to resort to ResEdit (Apple's powerful but tricky resource editor).

17. List Command-Key Shortcuts

Perhaps your problem is that you have too many Command-key shortcuts and you can't remember which does what. When you invoke a hot key, the freeware program MenuKey displays a list of all available Command-key shortcuts for the application you're currently running.

18. Install Your Own Fkeys

Lots of great Fkeys are available for the Mac. The problem is that there's no easy way to install them, barring the use of ResEdit. The shareware extension Easy KEYS comes to the rescue. It lets you assign Fkey documents (such as Balloon Printer or Out to Launch) to a key combination. The commercial equivalent is Suitcase, which adds the ability to let you easily install sounds and fonts.

19. Use Scripting

Apple used to ship a low-end macro program called MacroMaker with its OS, but it dropped it with the release of System 7. Macros define a set of actions (such as opening and printing a file) and activate them when you issue one command. Apple had favored a higher order of user macros called Apple Scripting; however, this too fell out of the final release of System 7. Several third-party tools let you have low-, medium-, or high-end macro and scripting capability. MacroMaker was picked up by GO Technology, which markets a System 7-compatible version. Tempo II is a higher-end program that has conditional branching for its macros — something no other program promises. At press time, QuicKeys 2 was the only Apple-events-aware macro program. Apple events tie applications together under a common program-linking interface. QuicKeys 2 makes the actual connection for those programs that support it, which weren't many at press time.

One program has taken macros to the next level — scripting. Frontier (in beta at press time) is a high-end development environment that provides sophisticated users

with the tools to really tie applications together. With Frontier, you can write a script that searches a database for information, extracts that information, places it in a page-layout program, formats it, and then uploads the layout to a service bureau for printing — all without any user interaction.

20. Color Your Menus

Even with a color monitor, the Mac still ships with dull black-and-white system software. ClickChange and the shareware application Colorize add hue and shade to the common desktop. These applications color the Mac's basic elements — such as windows, menus, dialog boxes, and scroll bars — with any of the Mac's 16.7 million available pigments. ClickChange also replaces the Mac's factory-issued cursor with something different, such as an index finger or a pointer of your own creation.

21. Change Your Hard-Disk Icon

Tired of your boxy hard-disk icon? The shareware program Visage lets you easily select a new hard-disk icon from 24 images, including cartoon characters and groovy-looking hardware. The nice thing about this program is that you don't have to use ResEdit.

22. Add Cut-and-Paste Video

QuickTime, Apple's multimedia system extension for managing time-based media, ought to be available from the usual system-software sources (dealers, on-line services, user groups, and so on) by the time you read this. It'll let you cut and paste new kinds of data — video, animation, and sound — to and from a new Scrapbook. Soon applications that exploit the new technology will start appearing too.

23. Add a Video Beep

While you're waiting for something serious to do with QuickTime, start off with a visual system beep. VideoBeep, the first QuickTime freeware, replaces the standard system beep with a video of your choice. Our favorite beep video so far is Arnold reciting his famous line "Ahl be bach."

24. Get Message Alarms

If you need to be reminded of impending

appointments, then go a step further than Apple's Alarm Clock with one of the many alarm utilities. The shareware application CClock alerts you with a customized message when an alarm sounds. AlarmsClock (Now Utilities) and Easy Alarms let users enter alarm items that can repeat every hour, day, week, and so on. Alarming Events is a full-featured DA that adds detailed alarm messages and a calendar.

25. Use a Desktop Calendar

If you want a date keeper for your desktop, try out Calendar DA, a shareware DA that goes well into the next millennium. This monthly calendar has a notepad for each day. The commercial DiskTools Calendar (File Director) offers a similar layout and also has a Find command and the ability to archive daily notes.

26. Enlarge Your Screen Area

MaxAppleZoom eliminates the black border you usually see on an Apple 13-inch monitor so that you can use it as screen space. As a result, you can increase the display area of your Apple 13-inch monitor by about 20 percent — from 640 x 480 to 704 x 512 pixels.

27. Switch Among Screen Depths

Some applications work better in black-and-white, and others demand color. If you want to avoid going to a control panel to switch among pixel-depth modes, then get

What Is Shareware?

Many of the utilities mentioned in this article are shareware that can be gotten from Macintosh BBSs, user groups, commercial shareware vendors, and on-line services such as Zmac. Shareware may seem as though it's free, but if you use it regularly, you should check the documentation to see if the author asks for a fee. Often shareware authors send updates and enhanced versions of their products to the people who pay. Paying shareware fees also helps encourage authors to continue releasing innovative software into the public domain.



MaxAppleZoom

24. Get Message Alarms

Alarm: Dentist Office

Time: 12:24:00 PM

Date: 10/08/1991

☐ Repeat Every:

Seconds

Minutes

Hours

Days

Weekdays

Weeks

Months

Years

☒ Time-out After: 15

When alarm goes off:

☒ Sound: Indigo
☒ Flash Menu Bar
☒ Flash Apple
☒ Show Alarm Name

October 1991

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

New...

Delete

Rename...

Cancel

OK



25. Use a Desktop Calendar



File Director



Helium 2.0

Pixel Flipper or Screen Flipper, shareware extensions that provide a Command-key shortcut to invoke a change. The commercial alternative, HAND-Off II, is smarter. It lets you define the correct mode for each application and then switches to it automatically as you switch applications.

28. Add Bidirectional Scroll Bars

The problem with the Mac's scroll-bar arrows is that you have to travel to either end of the screen to go in a particular direction. Scroll2 puts bidirectional arrows at both ends of the scroll bar so that you can go down even if your cursor is at the top of the screen.

29. Use a Hot Key for Balloons

On-screen Balloon Help is a good idea that is abundantly annoying. Turning on

Show Balloons activates every balloon your cursor travels over. How many times do you need to be told what a menu bar is? Helium inflates Help Balloons when you hold down a hot key. Letting go of the key deactivates Show Balloons.

30. Print Balloon Text

And what good is Balloon Help if you can't get hard copy? Balloon Printer is an Fkey designed by MacUser's Kurt Matthies that prints whatever balloon is currently active on-screen. It's available exclusively on Zmac.

31. Hide the Balloon Icon

If you are so frustrated by Balloon Help that you'd rather be rid of it altogether, then get NoBalloonsMenu, a freeware extension that removes the icon from the menu bar, thereby freeing up space on the right-hand side for other menu enhancements.

32. Display Fonts in Menus

Unless you know your fonts well, you may be left wondering what a particular typeface on your menu looks like. Two products display menus in a font's native typeface. MenuFonts and WYSIWYG Menus (Now Utilities) let you group families and otherwise organize your Font menus across multiple applications.

33. Keep Fonts in Suitcases

Installing fonts in System 7 is as easy as dropping them into the System Folder. If your system goes south, though, so do the fonts. Also, a system with lots of fonts can get really slow. That's why new versions of the venerable font and DA loaders Suitcase and MasterJuggler (both of which were in beta at press time) are still necessary tools for anyone who deals with lots of fonts. Both programs also include ways to avoid font-ID conflicts when you're switching documents among computers.

34. Access Special Characters

Can't remember what key combination creates a trademark or other obscure symbol? You've probably used Apple's Key Caps DA. An easier and quicker route, however, is to use PopChar, a Key Caps substitute. PopChar displays the character

set for the current font and then lets you select a character and paste it into your document without any complex Shift-Option keystrokes.

35. Use Desktop Printers

Desktop Printers are icons that represent various printers on a network. Drag a document or folder onto the icon to print from the Finder. Desktop Printers were originally supposed to be part of System 7, but they dropped out along the way. Now the same idea is back with DTPrinter, a freeware extension.

36. View Printer Queues

System 7 prints more slowly than does System 6. Maybe that's why Blue Parrot is such an attractive application. It lets you view who's printing what and in what order on a shared printer. With multiple printers on a network, you can choose the one that's less busy. Now all some developer needs to add is the ability to jump ahead of another job.

37. Auto-Save Documents

Unless you save documents meticulously every few minutes, it's likely that you've had a system crash destroy some of your work. Programs such as AutoSave II do a save for you at regular intervals. The same type of utility is being bundled with other packages — WorkSaver (QuickTools) and NowSave (Now Utilities), to name two.

38. Crashproof Your Data

Your information is only as safe as your last save. However, Last Resort gives you a second chance in the case of a system crash. This unique utility saves every keystroke you type as you type it, saving everything to a text file, including symbols for such actions as a deletion or a backspace keystroke. If your system crashes, you can rebuild your document from the backup file. A new text file is created every time you turn on your computer.

39. Automatically Compress Files

Hard disks may be getting larger, but so are files. Three programs help keep your disk from overflowing by compressing files when you're not using them. DiskDoubler



puts a Compress File menu onto the Finder so that you can highlight files and squash them down to half their size. SuperDisk automatically compresses files or folders saved with the suffix .s. SpaceMaker and an as-yet-unnamed product from Salient (both in beta at press time) promise to automatically compress files that you haven't used, after a certain period of time.

40. Back Up Data Continuously

Increasingly, users are turning toward automatic backup systems that mirror their main disk as they work. These systems are extra safe and make it likelier that you'll

34. Access Special Characters



Blue Parrot™

36. View Printer Queues

Blue Parrot™ copy

Blue Parrot™

Printer: Sales & Marketing (NT)

Current:

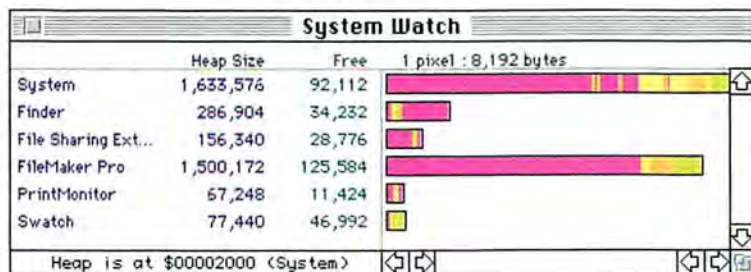
Waiting:

Ben T	Desktop	1	2	T
Owner	Document	Cp.	Pp.	T/M

Casa Blanca Works, Inc.

Greenbrae, CA 94904

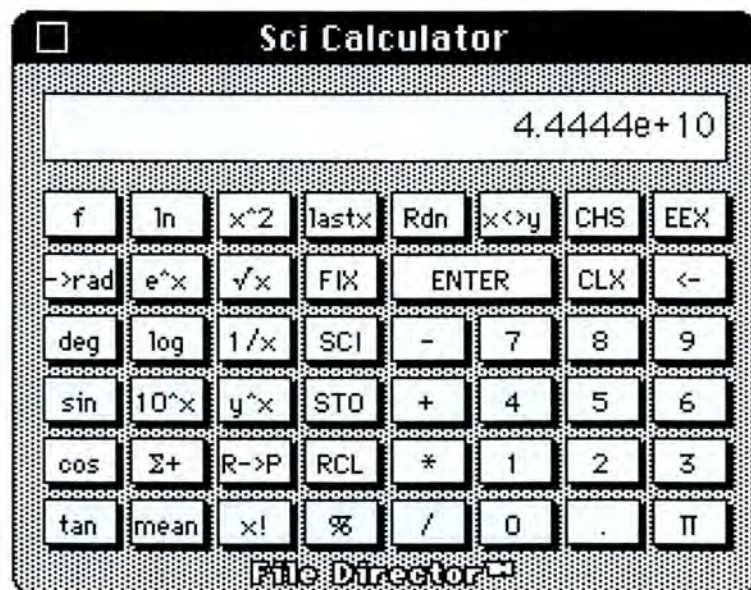
Ultimate System



45. Track Your Memory Allocation



49. Customize Your Calculator



get nearly all your files back after the inevitable crash. AutoBack and Twin-It both give you the luxury of duplicating your disk on a second hard disk as you work.

41. Password-Protect Folders and Disks

If you lock your file cabinet at work or home, then you'll want to do likewise with your Mac. It's easy to go overboard with complicated security packages, but a little basic protection may be good enough to serve as a deterrent for prying eyes. FolderBolt simply locks designated folders through use of a password. DiskLock and Barricade (QuickTools), on the other hand, require use of a password for you to mount a hard disk.

42. Empty Trash on Shutdown

Under System 6, trash gets thrown away when you shut down. But under System 7,

it keeps piling up until you select Empty Trash from the Special menu. TrashChute is a freeware extension that empties the trash when you shut down. It also uses Apple events to delete files when you drag them over the application icon.

43. Delete Files from the Keyboard

Basura (Fred's Finder Hacks) lets you highlight a file on the Finder and use Command-Delete to put it into the Trash. Command-Option-Delete puts the item into the can and empties it.

44. Use Virtual Memory with SyQuest Drives

System 7's virtual-memory feature lets you operate with more memory than you have in physical RAM by using hard-disk space to swap memory blocks. You can't assign removable drives as the home for your virtual RAM, however. Fortunately, a freeware utility, VMEject, corrects this for owners of SyQuest removable-cartridge drives.

45. Track Your Memory Allocation

If you want to see exactly how much of your virtual memory is being eaten up by various applications, try MultiMaster (Now Utilities), which displays a memory map of what's allocated and what's actually being used. A separate memory-sizer function lets you adjust the allocations for individual applications. Swatch is a freeware program that gives a similar display but in even more colorful and informative detail. Swatch also lets you compress a heap on the fly to help free up space.

46. Manage Extension Conflicts

The only problem with these utilities is that it's sometimes impossible to get them all to work together. That's the nature of extensions. Some conflicts may result in system crashes unless you pull the extension out of the System Folder. The freeware utility Extension Manager provides a checklist of extensions you can toggle on or off at startup or through a control panel. If you want more features, look to commercial products such as INIT Manager,

"Fastest overall printer..."

InfoWorld PostScript Printer comparison, June 10, 1991.



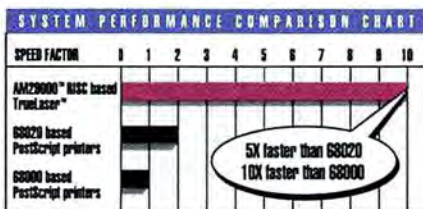
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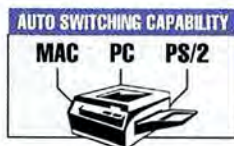
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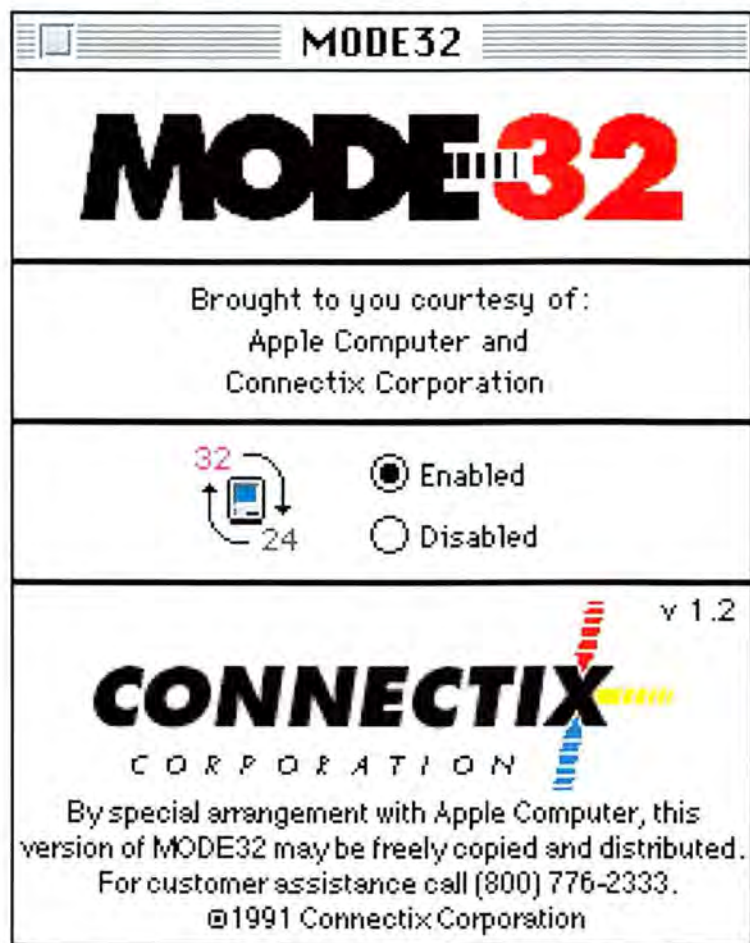
Ultimate System

INITPicker, or StartUp Manager (Now Utilities). With these utilities, you can define and load groups of extensions that work with one another or make extensions dependent on each other.

47. Analyze Your System Configuration

If you continue to have extension-management problems and you need to get advice from an expert, it helps to know

50. Go 32-Bit Clean



exactly what sort of system you're using. Several report generators can tell you intimate details about your Mac. Profiler (Now Utilities) and Technical Assistance Assistant (distributed with most CE Software packages) give an exhaustive report on your system configuration, down to the number of bytes each extension takes up in the system heap. TattleTale is a freeware DA that does all of the above and has an excellent help system too.

48. Analyze Your Hard Disk

After you have looked under the hood of your system, you can take a look under the hood of your hard drive with FWB's Hard Disk ToolKit. This disk-formatting and utility package includes an application that automatically analyzes your disk (no matter how mysterious the drive's origins) and installs an optimized System 7-savvy driver. The package's diagnostic utilities ensure that you can find out everything there is to know about any storage devices you may have connected to your Mac.

49. Customize Your Calculator

The calculator that ships with System 7 hasn't changed its interface since the Mac was introduced, but a bevy of more complex calculators offers specific features geared toward the type of number crunching you do most. Desktop publishers and designers should check out Calc+, a calculator with an easy-to-use interface and the ability to automatically convert among different units of measurement such as picas, inches, and centimeters. Scientists and engineers will want to add RPN (reverse Polish notation) Calculator or Sci Calculator (both part of File Director). Each adds a host of functions and modes you're likely to find on midlevel stand-alone calculators. As the name implies, 2000 Digit Calculator displays as many as 2,000 places for a calculation.

50. Go 32-Bit Clean

If you have a Mac II, IIfx, IIfx, or SE/30 and run System 7, you have probably already heard that your computer's not 32-bit clean, which means that you can't take full advantage of System 7 features such as virtual memory. To correct this problem (and avoid a slew of lawsuits), Apple bought MODE32, an extension from Connectix that adds 32-bit-addressing capabilities to these computers. Apple is giving MODE32 away through dozens of on-line services, BBSs, and user groups. For more information, call Apple Customer Service Center at (800) 776-2333 or (408) 996-1010.

Ben Templin manages Zmac, MacUser's on-line service. He also regularly reviews Macintosh products for several publications.

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Fred's Finder Hacks

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Oakland, CA 94610
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When Worlds Collide: Macs Versus Workstations

*Macs are becoming more powerful. Workstations are getting friendlier.
But has the Mac achieved workstation muscle? And are the new
personal workstations as easy to use as Macs?*

BY KELLI WISETH, GAYE L. GRAVES, H. B. J. CLIFFORD,
AND THE MACUSER LABS STAFF



No one was surprised when Apple announced the Mac Quadra 700 and Quadra 900 in October 1991 — for months, rumors of impending 68040-based Macs had been rampant. Equally unsurprising was the Quadras' zippy performance: as much as twice as fast, depending on the application, as the previous Mac champ, the IIfx (see "Dual Dynamos: The Macintosh Quadra 700 and 900," December '91, page 114).

What was surprising, on the other hand, was the number of low-priced

workstations entering the marketplace. While Apple was pumping up the high end of its product line, makers of workstations — powerful desktop computers designed for calculation- and graphics-intensive engineering, CAD, scientific, and publishing chores — were busy on the lower end of theirs, dropping prices and introducing entry-level machines.

The net result? Buying a personal computer is no longer simply a choice between Apple machines and IBM-compatibles. Today, workstation vendors such as Digital Equipment Corp.,



Silicon Graphics, and Sun Microsystems can offer you more computing power than Apple can with a Mac IIx or a Quadra — and at a lower cost. Now when you have \$7,000 to \$10,000 to spend on a personal computer, you face a lot more homework to determine the pros and cons of all the available platforms.

Or you can simply trust us. In this report, we do some of the work for you by exploring the differences between Macintosh computers and workstations. We take a look at the Digital DECstation 3100, NeXT NeXTstation, Silicon Graphics Personal IRIS, and

Shell Games

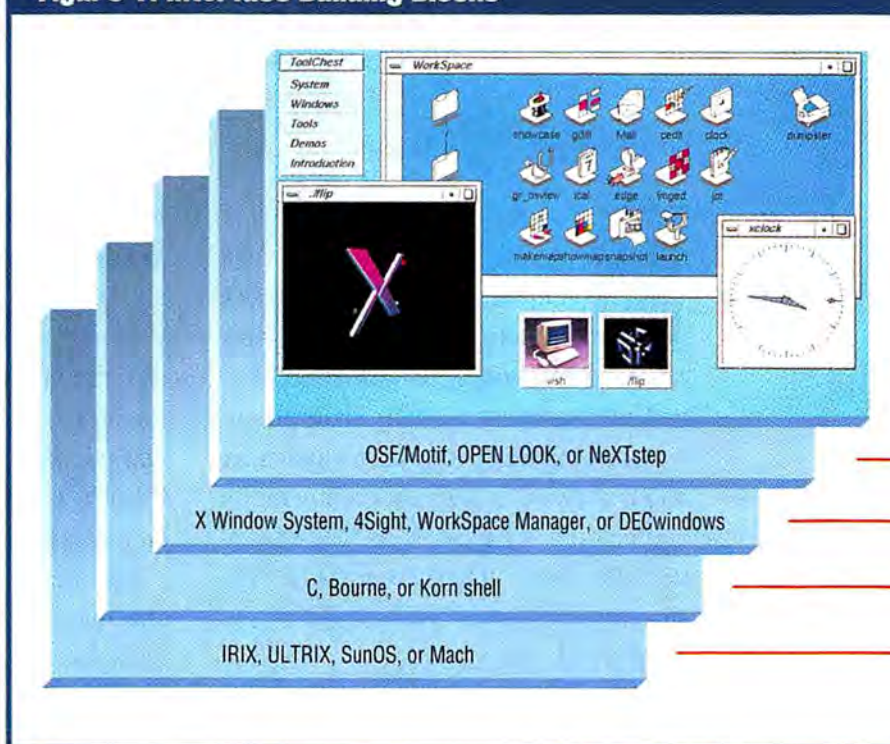
UNIX, the most popular operating system among workstation manufacturers, was developed by AT&T's Bell Laboratories in the 1970s, mainly to provide a convenient working environment for programming. UNIX's influence can be seen in many other contemporary operating systems, including the DOS and OS/2 operating systems used by IBM PCs and their myriad clones.

UNIX commands are processed by a *shell* — a command interpreter — that lies between the user and the operating system. Because the shell is treated as an application by the operating system, a variety of different shells can be used on the same workstation.

The *Bourne shell* is the standard UNIX shell, as developed by Bell Laboratories. Another shell in common use is the *C shell*, developed at UC Berkeley and related, not too surprisingly, to the C programming language. Both shells have a sparse command-line interface — fine for professional programmers or others with a technical bent but nowhere near as friendly as the Mac-like method of selecting commands from a menu or choosing icons with a mouse-driven pointer.

Using additional software components, you can build a graphical user interface for your workstation and use the bare shell only when you need to load software or make changes to your configuration. Fortunately, Apple's version of UNIX — A/UX — lets you work within the Mac's Finder, so you don't have to be UNIX-aware at all.

Figure 1: Interface Building Blocks



Sun SPARCstation IPC and explain differences in architecture, processing power, and functionality — what you can do with a workstation that you can't do with a Mac and vice versa. And we show you the results of industry-standard benchmark tests on the Mac IIx — the high-end Mac platform available at press time.

What's a Workstation?

Until recently, workstations were easy to distinguish from personal computers by who used them and how they used them. Research scientists, engineers, and publishers ran calculation- or graphics-intensive applications that performed statistical analysis, 3-D imaging and modeling, computer-aided design and engineering (CAD/CAE), and book production.

One advantage of workstations is that UNIX, the multitasking operating system that most use, lets users work on multiple tasks simultaneously. For example, you can use a CAD program to render a 3-D image of your new car

design in the background — which might take hours — while you work in another window to finish a cost/benefit analysis for upper management.

The increasing popularity of networking for personal computers is one reason why the gap between workstations and personal computers is beginning to narrow. Because workstation software often resides on a single machine that is shared by all, workgroup members' computers are connected in a network. The Mac has always had network capability — LocalTalk — built right in, but it's been painfully slow. However, Apple has solved that problem in the case of the Quadra by building Ethernet in to its motherboard. System 7's introduction has further narrowed the gap: *Thirty-two-bit addressing* allows the use of 4 gigabytes of RAM (although current hardware imposes a limit of 128 megabytes) and 1 gigabyte of *virtual memory*, which uses disk space as temporary RAM, letting you run more-powerful applications and solve

Figure 1: The graphical user interface we take for granted on the Mac takes several pieces of software in the UNIX-workstation world. The two most popular GUIs are OSF/Motif and AT&T/Sun's OPEN LOOK. Shown here is Silicon Graphics' WorkSpace, which is supported by OSF/Motif. It uses folders and icons in a customizable window.

Graphical user interface

Windowing system

UNIX command shell

UNIX OS

more-complex problems (see "70 Things You Need to Know About System 7.0," June '91, page 96).

RISCy Business

Despite these improvements, there are still significant differences between a Mac — even the high-performance Quadra 900 — and a workstation. At first glance, an entry-level workstation might seem more powerful than a high-performance Mac, simply because it has more of everything. Workstations typically have more RAM and more disk space — a basic workstation ships with at least 8 megabytes of RAM and about 200 megabytes of hard-disk storage. And these are just starting points; workstations are designed to support hard-disk storage in the multigigabyte range.

By building a great deal of expandability in to the Quadra 900 "tower," Apple has now given you the option of approaching workstation muscle. The 900 ships with a mere 4 megabytes of RAM, but it has 16 RAM

SIMM slots, so you can install as much as 64 megabytes of additional RAM by using 4-megabyte SIMMs. The 900 also has the space — and voltage — to support as many as three SCSI devices, such as large-capacity hard-disk, magneto-optical, WORM, multifunction, and CD-ROM drives. Ethernet and video are included on the motherboard, so you can use the five NuBus slots to add data-acquisition cards, graphics accelerators, and other enhancements.

In addition to offering more of everything, workstations often use a different overall design, or architecture. For example, workstations are increasingly based on a CPU-design technology called *RISC* (reduced-instruction-set computing). Because RISC microprocessors use simple, comprehensive instructions, overall processing throughput is good and computation-intensive tasks such as engineering graphics and simulations benefit greatly.

On the other hand, the Motorola 68040 — on which both the NeXTstation and the Quadra are based — uses an earlier CPU-design technology called *CISC* (complex-instruction-set computing). As CISC chips improve, they increase performance not by simplifying the instructions performed by the microprocessor but by upping the number of internal connections and decision-making elements within the microprocessor chip and by including more and more transistors. The 68040 chip is less than half an inch square, but it contains 1.2 million transistors, including a subset of the instructions previously handled by another chip, the 68882 FPU (floating-point unit) math coprocessor.

Whether a computer is RISC- or CISC-based, its performance can be improved by the addition of *multiple processors* — that is, by the use of specialized chips devoted to particular computing tasks. In a multiple-processor scheme, for example, the CPU delegates a hard-disk-access request to a separate processor and relinquishes control of that task until the data is

returned to the CPU. In a single-processor computer, on the other hand, the CPU must handle disk-access chores. The NeXTstation has 12 dedicated custom input/output processors for offloading much of the overhead — disk I/O, SCSI-bus control, serial-port access, and graphics processing, for example — that the central microprocessor on most Macintosh computers has to handle alone. Recently, Apple moved in the right direction by adding a separate IOP (I/O

Making the Connection

Workgroups use a variety of machines — Macs, DOS-based PCs, and UNIX-based workstations — all sharing the same cabling and, increasingly, the same documents. Planet X is connectivity software from InterCon Systems that enables UNIX workstations to control Macs that share the same network — something of a Farallon Timbuktu for UNIX. It lets UNIX workstations using the X Window System run Mac applications in a separate window on the workstation. Planet X software supports full color on Macs running System 6.0.5 and later, under both the Finder and MultiFinder. InterCon Systems Corp., 950 Herndon Parkway, Herndon, VA 22070; (703) 709-9890.

Before Planet X was introduced, Cayman Systems, maker of Mac networking products such as the GatorBox and GatorShare, announced XGator, which is similar to Planet X but supports only black-and-white Mac displays. (XGator 2.0, which will be shipping soon, will offer color and resizable windows.) Like Planet X, XGator lets network administrators manage Mac networks and support Mac users from their workstation. Workstation users with either XGator or Planet X can access a Mac, launch applications, and cut and paste between Mac and X applications.

XGator is fully compatible with the GatorBox CS (Cayman's LocalTalk-to-EtherTalk router) and other LocalTalk-to-EtherTalk routers — an essential feature when your Macs are on LocalTalk and your workstations are on Ethernet. Cayman Systems, University Park at MIT, 26 Landsdowne Street, Cambridge, MA 02139; (617) 494-1999.

Figure 2: Application Costs

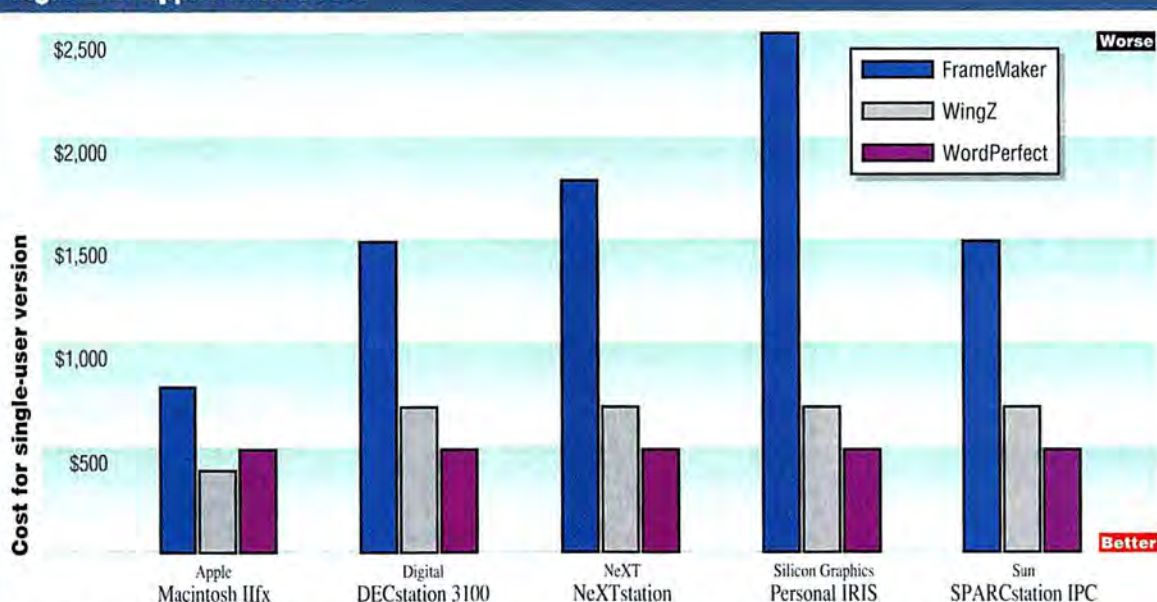


Figure 2: For the most part, workstation software is more expensive than the Mac version of the same software.

processor) for the serial ports on both the Mac IIfx and the Quadra 900.

In addition to these hardware differences, another distinction between Macs and workstations is that UNIX — the most popular workstation operating system — has features that distinguish it from the Mac's operating systems. Most operating systems — the fundamental software that tells a computer how to handle files, instructions, and the like — are written in the assembly language of the computer's microprocessor, so they are limited to a single family of computers. For example, DOS was written for the Intel 808x/80x86 family whereas the Mac's operating systems — from System 1 through System 7 — were written for the Motorola 680x0 family.

UNIX, on the other hand, was written primarily in C, a high-level language not tied to any individual microprocessor family. UNIX is thus a highly portable operating system — it even runs on IBM PCs and Macs (see "The Best of UNIX and the Mac: A/UX 2.0," January '91, page 118). Only a small portion of the UNIX *kernel* — the

hardware-dependent component of the operating system — is written in assembly language, so the UNIX operating systems of various workstations differ only slightly.

UNIX is a true multitasking multi-user operating system that supports *preemptive multitasking*, that is, CPU access is carved among tasks in such a way that no one process can completely monopolize processing time.

On the Mac, in contrast, one task can gain control of memory at the expense of other tasks — and one misbehaving application can bring down the whole system, no matter how insignificant it is or how well behaved the other applications sharing space under Multi-Finder or System 7 are. Furthermore, multitasking under Mac operating systems is only as smooth, swift, and elegant as the applications written for it. Fortunately, the advent of System 7 and its stringent multitasking requirements is convincing the last few developers who haven't yet made their applications multitasking-aware that it's in their best interests to do so — and the sooner the better.

Easier Installation

Until recently, a workstation's complex hardware and complex operating system have required an equally complex installation process. In the old days, you faced a crateload of manuals at the loading dock and a peppy manufacturer's rep fresh from a nearby airport hotel. Fortunately, workstation vendors are now paying closer attention to those of us who don't care about the joys of UNIX and three-day installation. Today's workstations are often shipped preconfigured with the operating system and other important files, making them virtually plug-and-play. Typically, you need only connect the physical components. The four workstations we looked at for this report, for example, came with complete instructions and plenty of diagrams to lead us easily through the installation process. Setup took only about half an hour for each.

Note, though, that if you're unfortunate enough to buy a workstation that hasn't been preconfigured or if you need to reconfigure your system, even just to add software or peripherals,

SPECTacular Performance

In the good old days — before 1988 — manufacturers could only argue about the relative performance of their workstations. Benchmarking was a nebulous and ill-defined area, with product testing slanted to show systems in a particular light. Speed was commonly rated in *MIPS*, or millions of instructions per second — a misleading statistic, especially when different microprocessors were compared. MIPS ratings tend to oversimplify the issue of CPU performance, and the definition of MIPS itself varies from manufacturer to manufacturer.

In 1988 four vendors — Apollo Computer, Hewlett-Packard, MIPS Computer Systems, and Sun Microsystems — began talking about how to properly evaluate and rate high-performance computers. Today that group — the Systems Performance Evaluation Cooperative, or SPEC — is more than 20 members strong and includes the likes of AT&T, Control Data, Data General, Digital Equipment Corp., Hewlett-Packard, IBM, Intel, Motorola Microcomputer Division, and Sun Microsystems. SPEC's charter is to establish, maintain, and endorse a standardized set of benchmarks that can be applied to high-performance computers. SPEC membership is open to any company or organization interested in meeting SPEC's goals.

The first release of the SPEC Benchmark Suite comprises ten cryptically named benchmark tests drawn from real-world applications that stress cache and memory systems. A geometric mean of the results from those ten benchmark tests is called the *SPECmark*.

The benchmark tests are large and long-running — five to ten minutes — to get a fair measure of performance. Because the UNIX operating system provides a standard software platform for many computer vendors, the SPEC Benchmark Suite is UNIX-based. The benchmarks can, however, be ported to other operating systems. The tests focus on CPU functions specific to applications used in the scientific and engineering fields. Future releases will focus more intensively on other aspects of system performance, such as memory, input/output, graphics, networking, and multiuser applications. SPEC doesn't simply define the test suite; it also reviews and approves the results as submitted by a manufacturer or test group.

MacUser Labs is the first group to install and run release 1.0 of the SPECmark test suite on a Mac. We installed version 2.0 of the A/UX operating system on an 8-megabyte, 40-megahertz Mac IIx. Performing the benchmarks involved loading and compiling the suite of ten tests; once underway, the tests were self-timing.

After calculating the geometric mean of the ten tests to find the SPECmark, we compared the Mac IIx's performance with that of several common similarly priced workstation platforms. The IIx lagged far behind (see Figure A). We estimate that the Quadra 700 or 900 would complete the same tests between one and a half and two times as fast — still well behind the Digital DECstation 3100, Silicon Graphics Personal IRIS, and Sun SPARCstation IPC. SPECmark-test results for the NeXTstation were not available at press time.

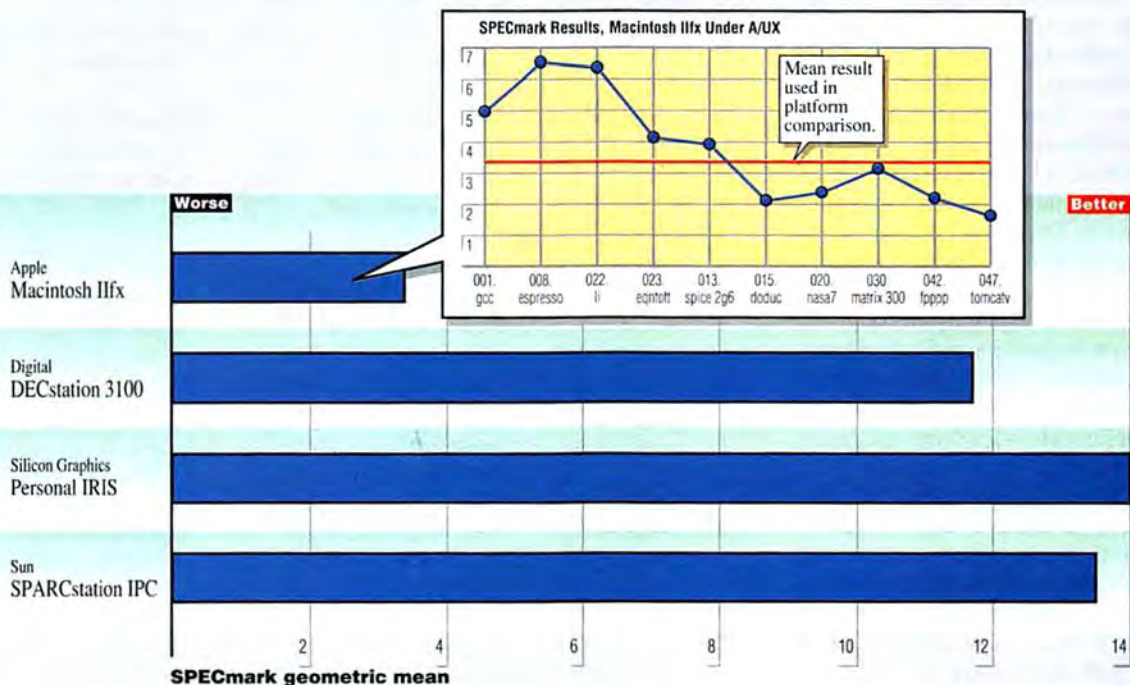


Figure A: Workstations are rated in *SPECmarks*, an industry-standard measure of processing power. The higher the number, the faster the workstation can complete a suite of ten benchmark tests that emphasize CPU, cache, and memory performance. The Mac Quadra 900 is, in general, twice as fast as a Mac IIx and can be expected to perform much better than the IIx in these benchmark tests. *SPECmarks* shown here for the DECstation 3100, Personal IRIS, and SPARCstation IPC were published in the *SPEC* newsletter over the past year. For further information about *SPECmarks*, contact *SPEC*, c/o NCGA, 2722 Merrilea Drive, Suite 200, Fairfax, VA 22301, or contact the individual workstation vendor.

you'll need a respectable command of UNIX. For example, we installed *ULTRIX*, Digital's version of UNIX, on our DECstation 3100, and it took us many frustrating hours to make directories, load utility programs, restore files from a *tar* (tape archive) file, set paths, and so on. The message to non-systems administrators was loud and clear: Don't try this at home.

That Warm and GUI Feeling

When you take a quick inventory of all the software components that go into building a workstation's interface (see Figure 1), you begin to fully appreciate the beauty of the Mac's operating system and Finder. Because UNIX is character-based, it requires several layers of graphics-enabling and windows-enabling software components to build a Mac-like GUI (graphical user interface).

At the lowest layer, above the UNIX *shell* (command processor — see the "Shell Games" sidebar), is the software needed to support a GUI display; most workstations use the X Window System — better known simply as X — which was developed at MIT in the mid-1980s. X is in its fourth release of version 11 and is now known as either X11R4 or X11.4. By building applications on top of X, vendors can easily *port* — reconfigure for a different computer — a word-processing or project-management application from, for example, a Sun SPARCstation to a DECstation.



X defines a low-level network-based *protocol*, or set of rules, that enables X applications to support displays anywhere on a network. It uses a client/server approach, which in the UNIX world is different from the client/server approach Mac users are accustomed to. The *X server* provides the means of input and output at a user's workstation by responding to requests made by the *X client* — the application program that needs to be displayed on-screen. Both client and server can run on a single workstation, or the server can run on one system and the client on another and they can communicate

over the network — for example, an X client running an animation program can be utilized by any workstation on the network that is running X server software.

But X doesn't include a complete user interface — no menus, no icons, no Trash; it provides only a foundation on which user interfaces can be developed. A couple of other pieces are still required for building a Mac-like interface in the UNIX environment.

On top of the X Window System, you need a window manager to control the size, placement, and stacking of windows on-screen. The two most prominent — and competing — window managers are Motif window manager, from the OSF (Open Software Foundation), and AT&T/Sun's OPEN LOOK window manager. The OSF is a vendor consortium launched by industry heavyweights, including Digital, Hewlett-Packard, and IBM; its

Table 1: Pros and Cons of Macs and Workstations

	 Pros	 Cons
Apple Mac Quadra 900 (System 7.0.1)	<ul style="list-style-type: none"> •Powerful general-purpose machine. •Easy setup. •Short learning curve. •File sharing. 	<ul style="list-style-type: none"> •No preemptive multitasking. •Limited additional processors. •Not RISC-based.
Apple Mac IIx (AUX 2.0)	<ul style="list-style-type: none"> •Runs Mac applications and UNIX X11R4 Window System applications. •Multitasking, file sharing. 	<ul style="list-style-type: none"> •Slow performance. •No preemptive multitasking. •Limited additional processors.
Digital DECstation 3100	<ul style="list-style-type: none"> •Adheres to OSF standards. •Excels at ECAD, MCAD, CASE, scientific and mechanical modeling. •Multitasking, file sharing. 	<ul style="list-style-type: none"> •Difficult installation. •Problematic interface. •Cumbersome documentation.
NeXT NeXTstation	<ul style="list-style-type: none"> •Display PostScript. •NeXTstep applications tool kit. •Stereo sound. •Simple installation. •Inclusion of Mac-like applications for word processing, graphics, and page layout. •Multitasking, file sharing. 	<ul style="list-style-type: none"> •Limited number of applications. •Quasi-UNIX operating system. •Doesn't support X Window System.
Silicon Graphics Personal IRIS	<ul style="list-style-type: none"> •Excels at graphics applications. •Display PostScript in Windows. •Inclusion of Mac-like applications for word processing, graphics, and page layout. •Multitasking, file sharing. 	<ul style="list-style-type: none"> •Limited number of beginning applications available.
Sun SPARCstation IPC	<ul style="list-style-type: none"> •General-purpose computing. •Large installed user base. •TOPS connectivity with Macs. •Easy installation. •Multitasking, file sharing. 	<ul style="list-style-type: none"> •Doesn't support OSF standards.

charter is to define standards for key technologies such as operating systems, windowing systems, and GUIs. Sun isn't a member. Both Motif and OPEN LOOK are designed to be independent of specific hardware platforms and operating systems, and most workstation applications can work with one or both of these GUIs.

Apple's UNIX, A/UX, is an altogether more attractive — and simple — story. It uses the Mac MultiFinder

interface, and A/UX users can run X client applications, Mac applications, and UNIX programs concurrently.

Soft Choices

Whether you choose a personal computer or a personal workstation, your decision should be based on the appropriateness of the applications available for it. Hefty processing power is meaningless if you can't harness it.

One major difference between applications written for workstations and those written for Macs is their cost — in both dollars and disk space. For example, FrameMaker, a popular multiplatform book-publishing and -design package, occupies 5 to 15 megabytes of disk space in its Mac version whereas FrameMaker for the Sun SPARCstation IPC occupies 10 to 40 megabytes. You'll notice a significant difference in cost as well: The single-user fixed-license Mac version costs around \$795, whereas the UNIX version can cost as much as \$2,500 (see Figure 2). Keep this cost difference in mind if you're considering moving away from the Apple family.

Not only is workstation software costlier but the availability of applications also varies from platform to platform. At the same time as office-productivity applications are being ported to workstations, more and more workstation applications are being ported to the Mac. For example, AutoCAD is available for almost all platforms — Macs, PCs, and UNIX workstations — except the NeXTstation. Surprisingly, at press time, no CAD packages were available for the NeXTstation.

Word-processing, spreadsheet, and page-layout programs are increasingly becoming available for workstations, but the Mac still holds a slight edge in some categories, particularly in the Mac's original stomping grounds — drawing, painting, typography, layout, publication design, and prepress. Workstations hold the advantage for specialized applications — finite-element analysis in an engineering environment, for example.

The Unusual Suspects

As with the Mac family, workstations have a broad range of capabilities and configurations. For example, Digital — one of the early players in the scientific-computing market — offers a broad range not only of workstations but also of related peripherals. The Digital DECstation 3100, a general-purpose workstation, starts at \$6,995 for an 8-megabyte diskless workstation with a 15-inch monochrome monitor — if you want storage space and color capability, be prepared to spend more. Digital also has a lower-priced — and lower-powered — workstation, the DECstation 2100, which starts at less than \$5,000. The DECstation runs Digital's version of UNIX — ULTRIX Worksystem Software — which combines the ULTRIX OS with DECwindows and is based on the X Window System. Digital also supports the OSF's Motif and includes Display PostScript, a slow but powerful way to achieve a true WYSIWYG relationship between the screen and the printed page.

NeXT made its debut touting strong applications for the education market and giving educators the ability to develop applications quickly — with full stereo sound and Display PostScript — for instructional purposes. The education market is no longer NeXT's strongest application area, however; the number of its business and publishing applications has grown quite a bit.

The Sun SPARCstation IPC's power and disk space may be just what you need to speed up your DTP shop. A solid general-purpose workstation, the SPARCstation IPC (\$9,995) is particularly suited to publishing, because of the 20-plus DTP packages available for it. This workstation is based on Sun's proprietary RISC SPARC (Scalable Processor ARChitecture) chip. The SPARC design enables Sun to easily adapt the chip to varying performance and cost levels. For \$9,995, you get a 16-inch color monitor, 8 megabytes of RAM, and a 207-megabyte hard-disk drive. SunOS,



Ideal Users

- Businesspeople, engineers, creative professionals.

- Technical users, creative professionals.

- Technical users, businesspeople, scientists, software developers, publishers.

- Publishers, educators, developers, businesspeople.

- Engineers, scientists, creative professionals.

- Businesspeople, creative professionals, technical users.

Sun's version of UNIX, runs on all of Sun's machines, and applications written to run under it can run on all SPARC-based platforms. Other vendors have begun cloning the SPARC chip. In addition to DTP, the SPARCstation is appropriate for technical applications that require low-cost color, expandability, and internal mass storage, and it is also well suited for running office-computing — spreadsheet, desktop-publishing, word-processing, and database — packages.

Whereas the Sun SPARCstation IPC is a good choice for text publishing, the Silicon Graphics Personal IRIS is better suited for high-end color graphics. The Personal IRIS' unique *Geometry Engine* — a dedicated graphics processor that performs graphics computations in parallel with the CPU — relieves the CPU from screen-redrawing tasks and greatly speeds graphics-intensive applications, offering faster refresh and rendering speeds as well as interactive 3-D graphics capabilities. The Personal IRIS is typically used by scientists and engineers to display complex data and 3-D interactive computer graphics, but it's equally at home on the desks of computer animators and in prepress service bureaus.

Time for a Change?

With the introduction of the Quadra 700 and 900, Apple is raising the standard for Mac computing at the same time as workstation manufacturers are lowering prices and bringing more entry-level systems, or *personal workstations*, to market. Although the Quadras are faster than the Mac IIx (see the "SPECTacular Performance" sidebar), they still can't compete with the performance of a comparably priced workstation as far as compute-intensive tasks are concerned.

For less than \$10,000, you can buy a high-performance 24-bit-color workstation with stereo sound for doing animation, 3-D graphics, CAD/CAE, and special effects. Even though earlier systems were hampered by a complicated command-line-driven

interface, most workstations now ship with a Mac-like GUI already installed. And competition among hardware vendors continues to drive platform costs downward, making non-Mac computing a more attractive alternative. So why not jump the good ship Macintosh?

For starters, the cost of software will quickly raise the price of your system far above that of a similar Mac system. There's far more easy-to-use and easy-to-learn general office-productivity software for the Mac — and at lower prices — which should give the Mac the advantage unless you need specific specialized workstation applications. The Mac is easier to set up; easier to equip with peripherals and software; easier to upgrade; and, of course, easier to use. And although we all crave unlimited speed and power, most Macs are plenty fast enough for most uses.

Also, keep in mind that — someday in the not-too-distant future — the

Apple/IBM alliance will produce results: Apple intends to use an implementation of IBM's RISC System/6000 POWER — Performance Optimization With Enhanced RISC — architecture for a RISC-based Mac. PowerPC microprocessors will provide a foundation for low-cost high-performance systems from Apple and IBM. Apple, IBM, and Motorola will together design the technology, and Motorola will manufacture the PowerPC microprocessors. And Apple promises that it will bring the Mac operating system to the PowerPC, which will remain compatible with today's Macs. So when that machine enters the market, the Mac will be a workstation and that workstation will be a Mac.

Kelli Wiseth is a *MacUser* senior editor. Gaye L. Graves is a writer specializing in animation, computer graphics, and special effects. Writer/consultant H. B. J. Clifford is a former contributing editor to *Personal Workstation* magazine.

The Bottom Line

The distinctions between personal computers and workstations are beginning to blur. While Apple is redefining the high end of its product line with the Quadra 700 and 900, workstation manufacturers are bringing personal workstations to market at very competitive prices. For less than \$10,000, you can buy a RISC-based 3-D-graphics workstation that can also run office-productivity applications. But don't give up on your Mac just yet.

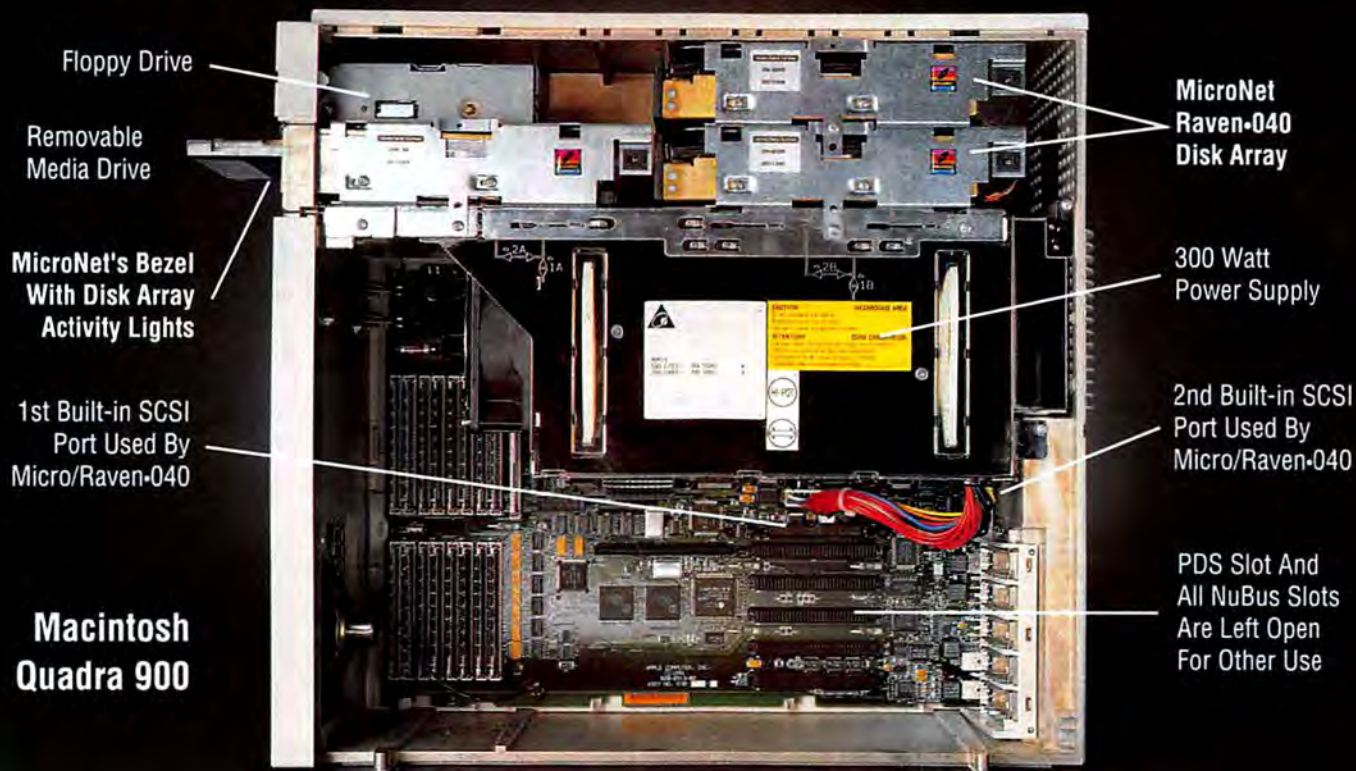
The arguments for remaining married to the Mac are many and varied. For one, workstation applications are more expensive and take up more hard-disk space than the same applications for a Mac. FrameMaker on a SPARCstation, for example, costs significantly more and requires two to three times as much space as on a Mac.

You should also take into account the complexity of UNIX, the favorite operating system of workstation manufacturers. Although most workstations ship with preinstalled components that provide a Mac-like graphical user interface, when you update or install new software, you need to know your way around the UNIX command-

line interface, which uses short, clipped mnemonics — *pr*, *tar*, *rm*, *vi*, *ls*, and *grep* immediately leap to mind — that are a far cry from point-and-click. You also need to know enough about UNIX system administration to make directories, install from tape, and build access to the application in to your windowing environment.

If you need a workstation for a specific purpose — special effects, animation, 3-D rendering, CAD/CAE, and the like — you'll be happy to discover that prices are dropping while power is increasing. Last summer Silicon Graphics began shipping the Indigo, a fast, powerful workstation that fills in the low end of its product line. The Indigo offers 8-bit color, dithered to full 24-bit-color values; digital audio; and support for sophisticated 3-D graphics — all in a RISC-based platform that costs less than \$10,000. Keep in mind, though, that the cost of software will quickly raise the system price above that of a similar Mac system. And we can expect Apple to bring out its own RISC-based platform — or see the Mac Finder appear on a RISC-based machine — when the Apple/IBM alliance bears fruit.

Disk Array • 040!



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Table 2: Features of Macs and Workstations

				
	Apple Quadra 900	Apple Macintosh IIfx	Digital DECstation 3100	NeXT NeXTstation
List price	\$9,199*	\$15,196	\$8,995	\$9,995
CPU	68040	68030	MIPS R2000	68040
Operating system	System 7.0.1	A/UX 2.0	ULTRIX 4.1	Mach 2.0
Windowing system	MultiFinder	MacX X11R4	DECwindows x.11	WorkSpace Manager 2.17
GUI	MultiFinder	Finder/UNIX shell	OSF/Motif	NeXTstep 2.1
Display PostScript	no	no	yes	yes
RAM	4 MB	8 MB	8 MB	16 MB
Hard-disk drive	400 MB	160 MB	209 MB	200 MB
Monitor	NA	21-inch, 8-bit	16-inch, 8-bit	17-inch, 16-bit
Warranty	1 year	1 year	1 year	1 year
Company	Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 (800) 976-2333 (408) 996-1010	Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 (800) 976-2333 (408) 996-1010	Digital Equipment Corp. 146 Main St. Maynard, MA 01754 (800) 344-4825 (508) 493-5111	NeXT Computer, Inc. 900 Chesapeake Dr. Redwood City, CA 94063 (800) 848-6398 (415) 366-0900

*This price does not include a monitor or a keyboard.

Table 2, continued

		
	Silicon Graphics Personal IRIS	Sun SPARCstation IPC
List price	\$11,500†	\$9,995
CPU	MIPS R3000A	SPARC RISC
Operating system	IRIX	SunOS 4.1
Windowing system	4Sight	OpenWindows
GUI	WorkSpace	OPEN LOOK
Display PostScript	yes	no
RAM	8 MB	8 MB
Hard-disk drive	200 MB	207 MB
Monitor	19-inch, 8-bit	16-inch, 8-bit
Warranty	90 days	90 days
Company	Silicon Graphics, Inc. 2011 N. Shoreline Blvd. Mountain View, CA 94039 (800) 800-4744 (415) 960-1980	Sun Microsystems, Inc. 2550 Garcia Ave. Mountain View, CA 94043 (800) 821-4643 (415) 960-1300

†At press time, Silicon Graphics discontinued the low-end Personal IRIS we evaluated and introduced the Indigo, a new low-cost high-performance workstation. The starting price for the Personal IRIS line is now around \$17,000.

Table 2 Criteria

CPU — The central processing unit is the chip that resides at the heart of the computer, manipulating data.

Operating system — A computer's operating system provides a means of communication between the user and the hardware.

Windowing system — A windowing system provides a means of displaying graphical information in a text-based environment. Graphical interfaces can then be built on top of this foundation.

GUI — The graphical user interface, also called the window manager, controls the size, placement, and stacking of windows on-screen.

Display PostScript — Does the interface system support Display PostScript, for true WYSIWYG?

RAM — Random-access memory is the computer's main memory, which stores the operating system and programs.

Hard-disk drive — A hard-disk drive provides physical storage for the operating system, interface components, applications, and data files.

Monitor — Your requirements for a monitor's size and pixel depth — 8- or 24-bit color — depend on the nature of the work you're doing. The more bits per pixel, the more video RAM required for display.

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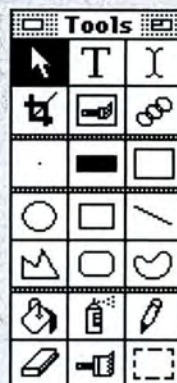
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- ▶ A Quick-Start Mini-Manual

▶ Easy's Palette has 21 Built-In Tools:



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They laughed when database, but every



Okay, so maybe I'm not in MIS, but I grinned and loaded FoxBASE+/Mac.

The next day, I showed them a sample of their PC inventory database with not just how much of anything we had, but with pictures showing exactly what it looked like.

I ran their dBASE sales analysis program (using a couple of new Mac screens I whipped out) as they watched FoxBASE+/Mac scream through the numbers.

And then I showed them the kinds of reports they could get, using data stored in Fox or dBASE IV/III+ files on the PC.

You could have heard a pin drop.

Then they were all over me with questions, so I just handed them the FoxBASE+/Mac manuals and smiled.

Besides not being in MIS, I'm not a professional programmer, so you can tell how easy FoxBASE+/Mac is.

For the inventory system, I just used



I brought in my own one's smiling now.

FoxBASE+/Mac to read the database files they had on the PC (it reads Fox and dBASE IV/III+ files directly). I added a memo field into which I cut and pasted pictures that our DTP department had for our customer literature. Then I used the MacDraw-like screen painter to create a great color Mac output screen.

The sales analysis was easy, too. I had to create new screens but FoxBASE+/Mac ran the rest of the dBASE III+ program just fine. (It typically runs as much as 95% of standard FoxBASE+/PC and dBASE III+ code with no changes.)

And I built the reports I showed them from scratch. With no programming at all.

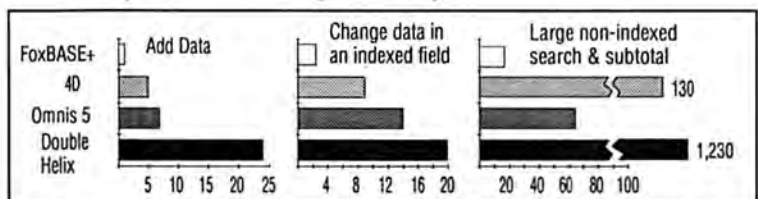
If you're looking for a better way to manage your data, call Fox Software and ask for their free demo. It limits the number of records you can store, but is the full program, so you can check it all out for yourself on your applications.

Around here, MIS has been pretty busy the last few weeks. They've hooked up Macs and PCs on an Ethernet network and our information and data processing systems are looking great.

They're building Hypercard-like applications I see people using all over the place.

Accounting likes all of this because the single-user version lists for \$495, and the unlimited Multi-User version is only \$695.

And even the PC programmers are happy. I hear them talking about things like the great trace and debugging facilities, adding XCMDs and XFCNs, the dBASE-like programming language, System 7 compatibility, full file and



As MacUser said, with FoxBASE+/Mac "data handling is extremely fast."

record locking in the multi-user version, and how FoxBASE+/Mac is "so astoundingly fast for a Mac."

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FoxBASE+/Mac™

Magnetic-Cartridge Drives: The Next Generation

The newest magnetic-cartridge drives are roomy, fast, and inexpensive — and the removable-storage revolution is just beginning.

BY OWEN W. LINZMAYER
AND THE MACUSER LABS STAFF

Magnetic-cartridge drives offer significant advantages over hard-disk drives. Infinite capacity and convenient data transport are only the beginning; cartridge drives are also ideal for quick and easy backup, effortless archiving, hassle-free security, and flexible startup options. That's the good news, but they also have drawbacks such as slow performance and, for some units, compatibility problems and questionable reliability.

The two leading manufacturers of magnetic-cartridge storage systems, Iomega and SyQuest, have recently improved their mechanisms' capacity and performance and are making claims of increased reliability. But despite these improvements, don't rush out and snap one up before you read this report. This new generation of magnetic-cartridge drives still has limitations, and a revolution in removable-media storage is about to begin.



PHOTOGRAPHY: STEVE UNDERWOOD



Removable Advantages

When you buy a hard-disk drive, you're purchasing a finite amount of storage and a lot of overhead. When you've filled the fixed disk, you must buy a new drive, complete with case, cables, and power supply. But magnetic-cartridge drives let you buy what you really need: more storage capacity. Filled up a cartridge? No problem. Just pop it out and pop in a replacement. A magnetic-cartridge drive is like an ever-expanding hard drive—although the amount of storage available at any time is finite and is equal to the capacity of a single cartridge.

Cartridges, thanks to their relatively small size and light weight, are excellent for transporting large amounts of data between machines. Portability was the driving force for establishing the familiar 44-megabyte SyQuest SQ555 cartridge as the standard for service bureaus and desktop publishers. If you have magnetic-cartridge drives at work and at home, you can easily work at either location with all your necessary files on one cartridge. However, although magnetic-cartridge drives are quite easy to set up, swapping cartridges with other users can create compatibility problems (see the "Five Solutions to Mounting Problems" sidebar).

Because you can boot your Mac from magnetic-cartridge drives and because their speed is comparable to that of hard-disk drives, magnetic-cartridge drives can be used as primary storage devices. Some users are taking advantage of this fact to switch between System 6 and System 7 simply by switching their startup cartridges. Others set up separate cartridges for various work categories. In environments where people need to share computers but not data, users can have personal collections of applications, utilities, and documents on their own cartridges.

Cartridges are also useful as archival and backup storage devices. Tape drives are still more economical on a cost-per-megabyte basis, but they don't offer random access, which means

Five Solutions to Mounting Problems

A removable cartridge doesn't simply show up on the desktop of its own accord unless it was inserted and spinning at startup. A *system extension* in your Mac's System Folder works with *driver software* on the cartridge so the cartridge automatically *mounts* on your Mac's desktop after startup, where it looks just like a hard disk.

System extensions and driver software vary among vendors, and you may run into difficulties trying to mount a cartridge from one manufacturer in the drive of another (see Table 1). Here are some tips on what to try when a cartridge won't mount:

1. Put the cartridge into the drive before turning on the Mac. Wait until the cartridge has *spun up* (reached its normal operating



speed) and the green light is on before you turn on your Mac. The cartridge icon should appear on your desktop just like a hard-disk icon. Remember that if you do load removable-media cartridges before startup and are using System 7 with file sharing turned on, you won't be able to eject your cartridges until after you've shut down the Mac or you have turned file sharing off. You can, of course, turn off the cartridge drive to remove the cartridge.

they're much slower than magnetic-cartridge drives (see "Less Is More: Digital Audiotape," October '91, page 116). Furthermore, tape drives can't double as startup devices, because they can't be mounted on the Finder's desktop as magnetic-cartridge drives can.

Finally, magnetic-cartridge drives are excellent choices for security-minded users. Instead of locking up an entire computer system or employing cumbersome encryption schemes, you can simply store cartridges in a vault or



2. Use the most recent version of your magnetic-cartridge drive's driver software. Since the release of System 7, the majority of manufacturers have updated their driver software. If you are unable to mount a cartridge that was formatted on another drive made by the same manufacturer — you receive an error message, or the cartridge simply fails to mount — you should check the version number of the driver on the cartridge to make sure it matches the extension in your System Folder.

3. Use SCSI Probe or SCSI Info to mount the cartridge manually. Remove all the magnetic-cartridge-drive system extensions and control panels from your System Folder, and use SCSI Probe or SCSI Info to mount the cartridge.



take duplicates off-site to prevent data loss in the event of theft, fire, or any other catastrophe.

The Players

Three major types of magnetic-cartridge drives are available to Mac users. One, with a sturdy mechanism and cartridge design made by Ricoh, is sold by GCC and Microtech and is limited to 50 megabytes of storage space. The remaining two mechanism manufacturers, Iomega and SyQuest, have introduced mechanisms that

4. Don't partition cartridges. Some drivers don't recognize partitions correctly and want to repair the disk instead, which destroys all your data. Another reason to



avoid partitioning cartridges is that you'll have to reboot your Mac to swap cartridges if more than one partition is mounted on the desktop.



5. Use the same formatter and driver for all of your SyQuest cartridges. If the cartridges in your library use an assortment of formatters — different driver versions and different vendors — you may have an assortment of mounting problems. Use a *universal formatter* such as Silverlining, from La Cie, or Drive7, from Casa Blanca Works. Most universal formatters can also update a driver without destroying data — but always back up first.

— Peter Baum

nearly double the Ricoh limit: Iomega's Bernoulli 90, a 90-megabyte drive, and SyQuest's 88-megabyte SQ5110 mechanism. In this report, we focus on drives that use these two units.

Unlike Iomega, SyQuest prefers to be an OEM (original equipment manufacturer), selling its mechanisms to third-party vendors who complete the package by adding a power supply, a case, connectors, software, and so on. Although all SyQuest mechanisms originate in the same Fremont, California, factory, the finished drives are

markedly different from each other — making your job as a consumer considerably more difficult.

To help you make the right choice, MacUser Labs gathered a mountain of high-capacity external magnetic-cartridge drives: the Bernoulli 90, from Iomega, and 22 SyQuest SQ5110-based drives from various third-party vendors. (Iomega also sells the Bernoulli 90's mechanism in a dual-drive configuration.)

We ran all 23 drives through a series of speed tests and disassembled them to evaluate their construction, power supply, and case design. Then we called dealers across the country to compile a street-price index and we also investigated the service options offered by each vendor. Finally, recognizing that not everyone buys drives for the same reasons, we tabulated, sorted, and cross-referenced our results to pinpoint the best deals in speed, design and construction, service and packaging, and a combination of these factors.

Bigger and Faster

Iomega and SyQuest have been making removable-cartridge drives since long before the introduction of the Mac. SyQuest claims to have shipped more than 500,000 drives and 2,000,000 cartridges since 1982; Mac products now account for 75 percent of its sales. Iomega, on the other hand, claims to have sold about 700,000 drives and 4,000,000 cartridges; its Mac products account for 30 percent of its sales. SyQuest's 44-megabyte SQ555 mechanism is widely regarded as the industry standard for transporting Mac data to service bureaus, and the 44-megabyte Bernoulli Box has been the mainstay of PC users.

Packing more bits onto a track and more tracks onto a disk, the new SyQuest SQ5110 mechanism can store 88 megabytes on a 5.25-inch removable cartridge — double the capacity of the SQ555 mechanism. Iomega uses a similar scheme to boost the Bernoulli 90's storage capacity, from 44 to 90 megabytes.

This increased capacity comes at

the expense of backward compatibility — Iomega and SyQuest claim that their new mechanisms can read from, but not write to, their lower-capacity cartridges. This limitation alone can outweigh all the other improvements if you need to exchange cartridges with users of older drives. Don't worry, though — SyQuest and Iomega plan to continue manufacturing the older-style drives and compatible cartridges.

Track and bit packing increases both drive performance and capacity. All else being equal, the more bits per inch, the more data can pass under the read/write head in a given amount of time and, hence, the faster the drive. But things aren't equal, because SyQuest and Iomega have taken other measures to increase drive speed further. The SyQuest SQ5110 incorporates a 32K read *cache*, a buffer that usually holds the data blocks that are next in line, which the company claims produces higher transfer rates.

The Bernoulli 90 also has a 32K cache, which Iomega claims yields an "effective access time" of 19 milliseconds and higher transfer rates. Our test results substantiate the speed-improvement claims. In fact, we found a 41-percent increase in sustained throughput for the 88-megabyte SyQuest drives over the 44s and 79 percent for the Bernoulli 90 over Iomega's 44-megabyte Bernoulli Box — but more about speed later.

Not only do the new drives store more data and perform faster but they're supposedly more reliable too. SyQuest gives the SQ5110 an MTBF (mean time between failures) rating of 60,000 hours, double that of the SQ555. The Bernoulli 90's MTBF is the same as that of the Bernoulli Box, 60,000 hours, but the new drive incorporates an automatic head-cleaning mechanism that should increase reliability and eliminate the task of periodic manual cleaning.

Portable But Delicate

One criticism of SyQuest technology is that the cartridge is basically an unsealed hard disk in a plastic shell

How It Works: High-Capacity Magnetic-Cartridge Drives

SyQuest

A thin cushion of moving air helps keep the read/write head from touching the surface of the disk. Unfortunately, damaging contact between the two can occasionally occur.

When the drive is turned off, the read/write head moves away from the surface of the drive to prevent head crashes.

A highly polished aluminum disk, plated with a thin film of magnetically sensitive metal alloy, is encased in a removable protective plastic cartridge.

A small diagonal barrier in the top right corner of the opening aligns with a matching diagonal edge on the cartridge to prevent backward insertion of the cartridge, which can result in damage to the heads.

Once the disk has been inserted, its metal hub is grabbed by the magnetized drive spindle.

The cartridge's access door is opened, and the read/write heads (operated by fast voice-coil actuators) are inserted and brought close to the disk surface.

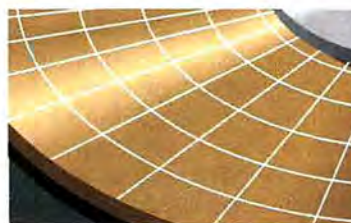
A 32K cache stores frequently used data to enhance performance.

A write-protect switch on the cartridge prevents accidental erasure.

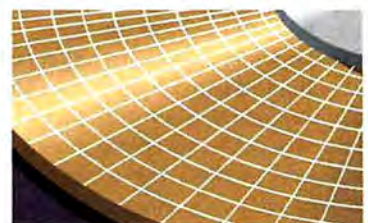
A spring-loaded sliding access door does little to prevent unintentional entry, although it is self-closing.

Both SyQuest and Iomega have increased *track density*, allowing twice as many tracks on the disk as on their 44-megabyte models, and have raised *bit density* — fitting more bits per track — to increase capacity. Because more bits are packed into the same amount of space, more data can pass under the heads in the same amount of time, resulting in increased performance.

To write reliably to these smaller regions, the read/write heads must be narrower and use less power to avoid inadvertently changing neighboring bits. Both manufacturers claim that these smaller heads can still reliably read data from the larger data bits of the 44-megabyte disks but cannot write to them reliably.



44-megabyte

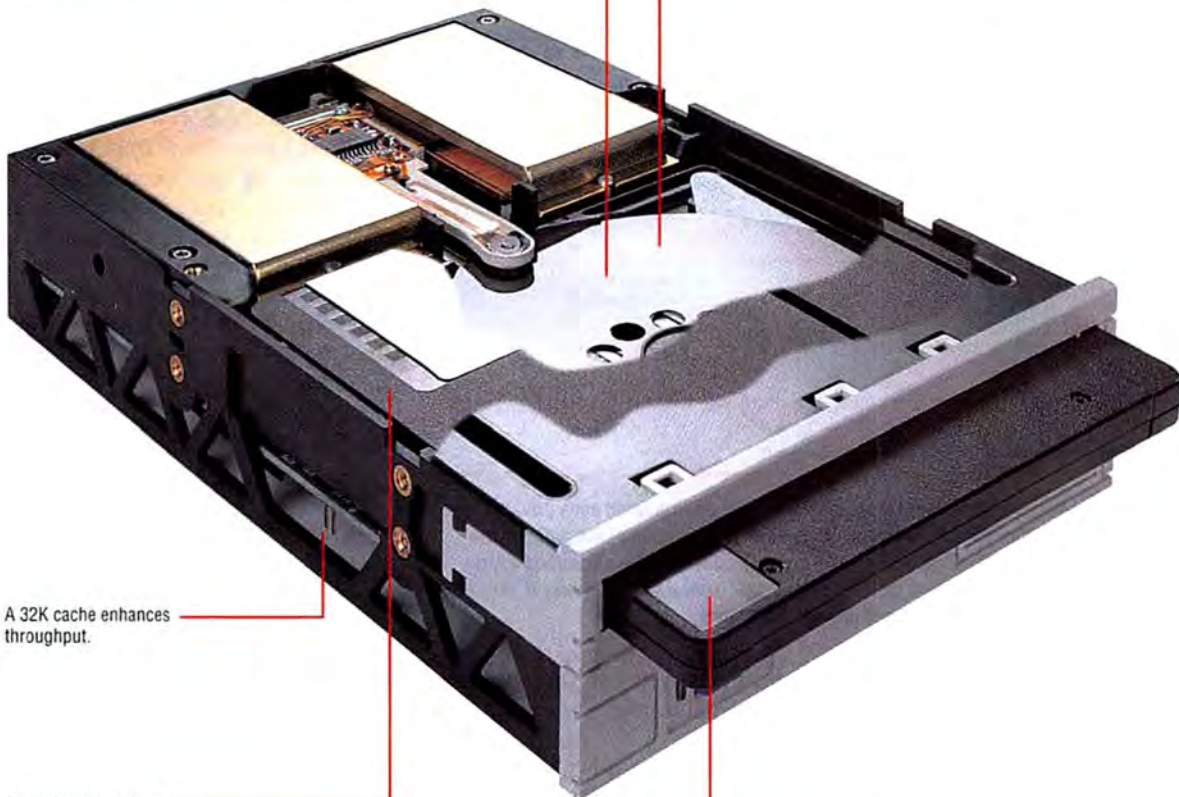


88-megabyte

Iomega

The barium-ferrite medium of the 44-megabyte disks has been changed to a metal-particle medium — much like videotape. This new all-metal medium has raised the disks' *Orsted rating*, a magnetic measure, from 750 in the 44-megabyte version to 1,500 in the 90-megabyte version. This allows data bits to be reduced in size without a reliability reduction. This medium also has a longer overall life span than its predecessor.

As the thin, flexible plastic disk spins under the drive's read/write heads, air moves outward over the disk's surface.



A 32K cache enhances throughput.

An automatic spring-loaded metal shutter closes when the cartridge is ejected.

A write-protect switch on the cartridge prevents accidental erasure.

Unlike SyQuest drives, which operate much like hard-disk drives, the Iomega Bernoulli 90 drive uses an aerodynamic phenomenon called the Bernoulli effect.

Air passes quickly between the disk and the read/write head. In that narrow gap, the air pressure is reduced. As a result, a small portion of the flexible disk is pulled up almost into contact with the read/write head. The precisely controlled air pressure helps prevent head crashes.

When the drive is turned off or when the flexible disk stops spinning before a cartridge is ejected, the disk surfaces are no longer pulled toward the read/write heads, because air pressure in the vicinity of the head is the same as in the rest of the drive.

Like the SyQuest drive, the new generation of Iomega drives has increased track and bit density. Iomega has also increased the *spindle speed* (the rotation speed of the disk) to reduce *latency* (the time it takes to retrieve data after a full rotation) and pass more data under the heads in the same amount of time to improve performance.



The Bernoulli effect

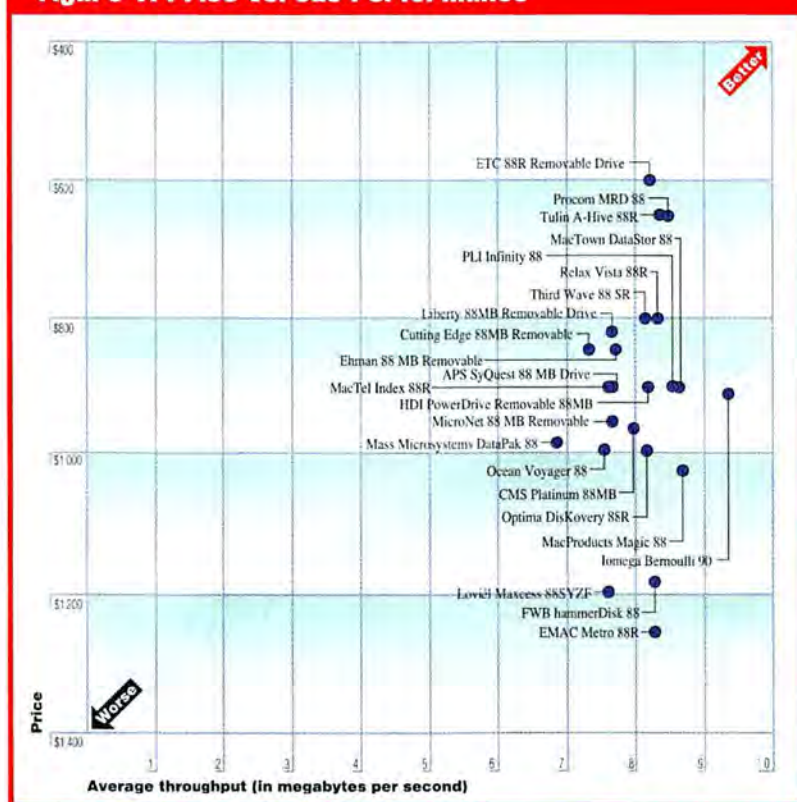
Figure 1: Price Versus Performance


Figure 1: To determine a simple bang-for-the-buck rating, we compared each drive's street price with its average throughput. The lower-priced drives are shown at the top, and the faster drives are on the right. All the drives — SyQuest and Iomega — performed nearly alike, so price is the more important factor in this comparison. If saving money is your only concern, the ETC 88R Removable Drive is the obvious choice.

(see the "How It Works: High-Capacity Magnetic-Cartridge Drives" sidebar). As such, it is vulnerable to contamination from dust and microscopic materials whenever the cartridge's shutter opens. Contamination can cause anything from bad sectors to head crashes. A head crash is a disaster that occurs when the heads touch the rigid but delicate surface of the disk — when the two meet, the results are often fatal for the head or the disk and sometimes for both. A SyQuest disk is thicker than an average hard-disk platter, so it's a little more durable, but this increased thickness can occasionally cause problems. The SyQuest's thick metal disk readily absorbs heat; thus it expands and contracts as temperature fluctuates. This expansion/

contraction cycle can stress the magnetic medium and possibly cause data loss.

SyQuest plays down the threat of contamination and places the blame for most mechanical problems on users who treat cartridges like robust floppies instead of the delicate hard disks that they are. Although the SQ5110 has not been reengineered to address the contamination issue, it's more idiotproof than the SQ555. You can no longer stick a cartridge in backward or eject a cartridge while it is spinning — two ways in which careless SQ555 users can damage the read/write heads.

Iomega drives and cartridges are relatively immune to head crashes. As a Bernoulli 90 disk spins, at 2,368

rpm (revolutions per minute), the velocity of the air in the cartridge increases, causing a decrease in air pressure on the disk's surface. The flexible disk is drawn extremely close to, but does not touch, the drive's read/write heads — even under the most unstable conditions.

A drawback of the Iomega drives' virtual immunity to crashing is that the magnetic medium in the cartridge wears out over time, because it flexes slightly while passing over the read/write heads (see the "How It Works: High-Capacity Magnetic-Cartridge Drives" sidebar). To address this problem, Iomega's Workshop formatting software keeps track of media wear, warning you when the end of your disk's life span is near. Disks can also be set to stop spinning after a specified period of inactivity, which lengthens disk life. The drawback is that you must wait four seconds while the cartridge is spinning up to speed for each subsequent access, which makes the Sleep mode inappropriate for disk-intensive applications.

Imperfect Compatibility

In order for your Mac to automatically mount a magnetic cartridge inserted after startup — cause it to appear on the desktop — you must have a system extension or a control panel in the System Folder of your startup drive that recognizes and can initiate the driver software on the cartridge. Formatting software and system-extension or control-panel files are often unique to each manufacturer and are found on the floppy disk(s) you get with your new drive.

Although most high-capacity SyQuest and Iomega magnetic-cartridge drives ship with a free starter cartridge, sooner or later, you'll fill it up and need a fresh one. You won't be able to simply pop a new, unformatted cartridge into your drive, however; you must first initialize it — prepare it for use — just as you would with a new hard-disk drive.

However, because the Macintosh computer's operating system is unable

to initialize removable media other than floppy disks, you won't see the familiar "This disk is unreadable. Do you want to initialize it?" dialog box. Instead, you must use the *formatting software* that ships with your drive to initialize the cartridge and install the *driver software* that lets your Mac transfer data to and from the cartridge.

Formatting software writes and tests a pattern of sectors on the disk's surface so your Mac can write files to the cartridge. If you choose, the disk can be divided into fixed regions called partitions. Two users sharing a cartridge, for example, can each have their own partition. You might have one partition formatted for use with A/UX and another for the Mac operating system. But if you plan to move a SyQuest cartridge among drives, think twice before partitioning it — especially if you choose to password-protect the partitions — because mounting a partitioned cartridge on a drive from another manufacturer is risky. The cartridge may not mount, and in some cases, you may even be asked if you want to repair the disk — click on No, because the repair process may destroy all your data.

After you've decided whether to partition the disk, the formatting software installs *driver software* onto it, allowing the Macintosh to access and use the drive. Here's where the fun begins. Apple hasn't published rules for removable-cartridge driver software, as it has for hard-disk driver software. Although some vendors' system extensions can recognize driver software from other vendors, some recognize only their own. What's worse, some even try to initialize cartridges already initialized by another vendor's software, thus erasing any files that are on those cartridges. Because SyQuest removable-cartridge drives are available from a variety of vendors, compatibility problems abound (see Table 1). On the other hand, because Iomega is shipping all of its Bernoulli drives with the same driver software, compatibility is not an issue.

Figure 2: Price Versus Construction/Design

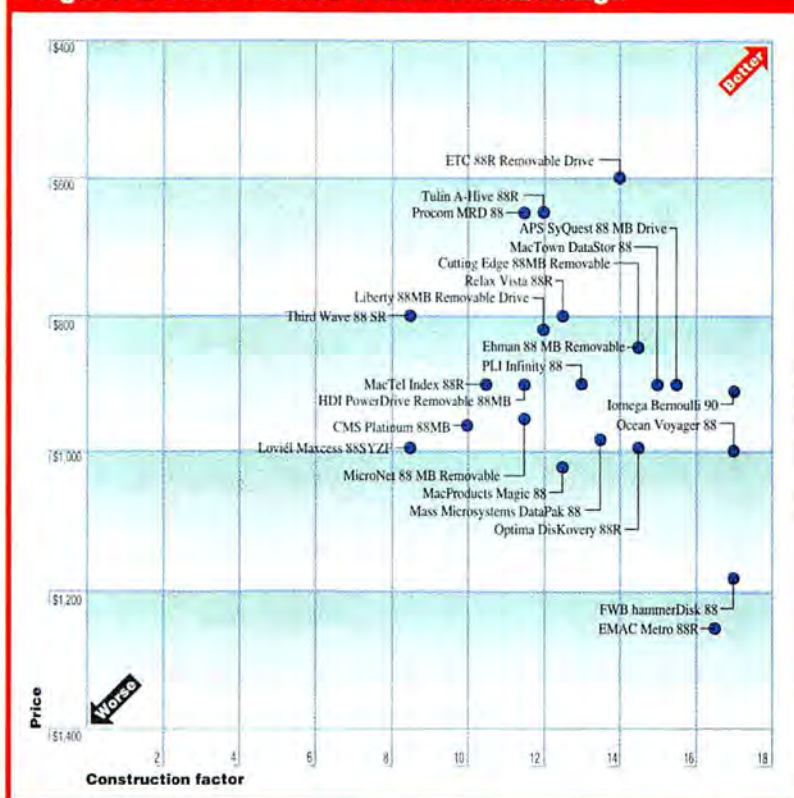


Figure 2: One measure of value is how well built a drive is, compared with its cost. To illustrate this, we compared drive price with construction and design; the lower-priced drives are shown at the top. The better-designed and -built drives are farther right. Nearest the top right corner, the ETC drive — by virtue of its incredibly low price — and the Iomega drive — because of its solid construction — offer the best construction-and-design values.

Costly Cartridges

When comparing the cost of magnetic-cartridge drives, you must consider the initial outlay for the drive as well as the price of additional cartridges. Mail-order houses currently charge around \$150 for each 88-megabyte SyQuest or Bernoulli 90 cartridge, roughly double the price of lower-capacity cartridges. All the manufacturers except Liberty and MacProducts provide one free cartridge with their drives (Iomega ships a cartridge on receipt of your registration card), and some of the cartridges contain bundled shareware. To maintain a level playing field, our price comparisons are based on the street price of complete drive/cartridge combos.

MacUser Labs contacted a sampling

of dealers throughout the United States to ascertain the average — not necessarily the lowest — street prices of the drives reviewed. At roughly \$1,200 for the most-expensive drives — the EMAC Metro 88R and FWB hammerDisk 88 — you can buy two ETC 88R Removable Drives, the lowest-priced units, at \$599 each. SyQuest SQ5110 drives have an average list price of \$890, and street prices for these drives are about 30 percent lower. In comparison, 100-megabyte fixed-hard-disk drives average \$675 (see "Searching for Storage Perfection: 100-Megabyte Hard Drives," November '91, page 124).

Iomega's Bernoulli 90 lists for \$1,149 (the two-drive model costs \$2,249), and you must buy a Mac

Table 1: System-Extension and Driver Compatibility

		System extensions													
		CMS	CMS SCSI Utility	Cutting Edge Removable Formatter	EMAC	EMAC Drive Utility	ETC	ETC Tools	HDI	Disk Manager Mac	Liberty	FormatterOne	MacTel	Index	HD Utilities
Formatted cartridges	CMS	●●●	●●●	●	●	●*	●	●*	●●●	●●●	●●●	●			
	Cutting Edge	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●			
	EMAC	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●			
	ETC	●	●	●	●●●	●●●	●	●	●	●	●	●			
	HDI	●●●	●●	●	●●	●●	●●●	●●●	●●	●●	●●	●●			
	Liberty	●●	●●	●	●●	●●	●●	●●	●●	●●	●●	●			
	MacTel	●	●	●	●●	●	●	●	●	●	●	●●			
	Mass Microsystems	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●			
	MicroNet	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●			
	Optima	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●			
	PLI	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●			
	Relax	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●			
	Casa Blanca	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●			
	Golden Triangle	●●●	●●●	●●●	●●	●●	●●●	●●●	●●●	●●●	●●●	●●●			
	La Cie	●●●	●●●	●●●	●	●	●	●	●●●	●●●	●●●	●●●			
	Software Architects	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●			

Table 1: To test whether each high-capacity magnetic-cartridge drive could mount cartridges formatted on drives from different manufacturers, we formatted 13 unpartitioned cartridges with their driver software. We also formatted 4 unpartitioned cartridges with third-party universal formatting software and its system extensions.

Across the top of this chart are the names of the system extensions

we installed, and on the left side are the names of vendors of formatted cartridges. We swapped all the formatted cartridges through a single generic SyQuest mechanism. We checked whether the cartridges mounted automatically, required SCSI Probe in order to mount, or refused to mount altogether and whether the combination of system extension and driver software on the cartridge crashed the machine.

	Mass Microsystems PadLok	MicroNet MicroNet Utility	Optima DiskMount	PLI PLI Formatter	Relax Relax Installer	Casa Blanca Drive7	Golden Triangle DiskMaker	La Cie Silverlining	Software Architects Formatter Five	
•	•••	•	•*	•	•	•••	•	•••		CMS
•••	•••	•••	•••	•••	•••	•••	•••*	•••		Cutting Edge
•••	•••	•••	•••	•••	•	•••	•••	•••		EMAC
•	•	•	•	•	•	•	•	•		ETC
••	••	••	••	••	•	••	••	••		HDI
••	••	••	••	••	••	••	••	••		Liberty
••	•	•	•	•	•	•	•	••		MacTel
•••	•••	•••	•••	•••	•••	•••	•••	•••		Mass Microsystems
••	••	••	••	••	••	••	••	••		MicroNet
•••	•••	•••	•••	•••	•••	•••	•••	•••		Optima
•••	•••	•••	•••	•••	•••	•••	•••	•••		PLI
•••	•••	•••	•••	•••	•••	•••	•••	•••		Relax
•••	•••	•••	•••	•••	•••	•••	•••	•••		Casa Blanca
•••	•••	•••	•••	•••	•••	•••	•••	•••		Golden Triangle
•	•••	•••	•••	•••	•••	•••	•••	•••		La Cie
•••	•••	•••	•••	•••	•••	•••	•••	•••		Software Architects

Some of the system extensions could recognize driver software from other vendors: Driver software shipped with the drives from Relax, PLI, Mass Microsystems, and Optima was recognized by all system extensions tested. ETC's driver software, on the other hand, was not recognized by most system extensions, and not even SCSI Probe could help. CMS' driver software caused several system crashes.

Several of the third-party drivers (see the yellow portion of the chart) fared quite well. Formatter Five, from Software Architects, and Drive7, from Casa Blanca Works, proved to be very versatile. Golden Triangle's DiskMaker and La Cie's Silverlining, which are powerful formatting programs, were relatively weak when it came to recognizing different cartridges.

Figure 3: Price Versus Documentation and Support

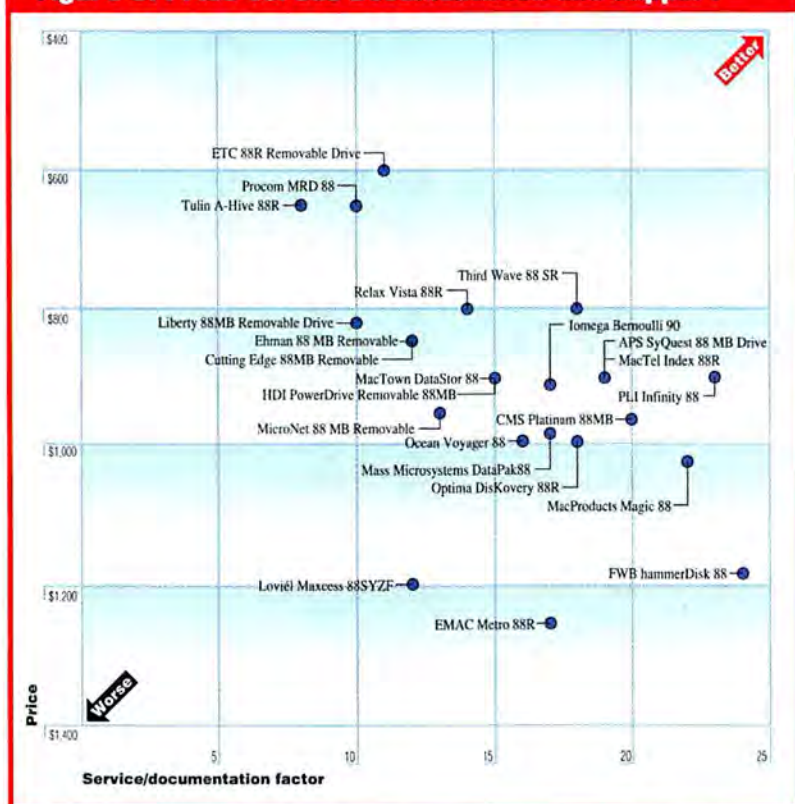


Figure 3: Because of potential mounting and compatibility problems, a cartridge-drive vendor should offer considerable after-sale service and support. To discover the most-cost-effective hand-holders, we compared drive price with quality of service and documentation. The lower-priced drives are shown at the top; the farther to the right, the better the service and documentation. Nearest the top right corner are the Third Wave and PLI units — the documentation-and-support value leaders.

Interface Kit for \$49 or \$129, depending on whether you want Central Point's Backup or Dantz Development's Retrospect. You can get a complete Bernoulli 90 package from mail-order sources for less than \$800, which is competitive with SyQuest pricing.

Few Performance Differences

MacUser Labs performed several tests to measure each drive's overall speed. Not too surprisingly, there was little statistically significant variation in the performance of the 22 SyQuest drives. The small differences we discovered could be attributed to differences in the driver software or possibly in the cartridges. It can take longer

to find data if a cartridge has bad blocks.

We used the shareware utility SCSI Evaluator 1.07 (available on Zmac) to measure *throughput*, the rate at which information is read from the disk and passed through the SCSI port to your Mac. With an average read/write throughput of .94 megabytes per second, the Bernoulli 90 is roughly 17 percent faster than an average SQ5110 drive (.80 megabytes per second) and about equal to an average 100-megabyte fixed-hard-disk drive (see Figure 1). But throughput as measured in a lab doesn't tell the whole story.

For real-world results, we ran two tests. Because magnetic-cartridge drives are often employed as backup

The 3.5-Inch Solution

Magnetic-cartridge drives have ruled the removable-storage world for years, but their reign may be coming to an end. A new crop of optical-media drives is appearing, offering advantages in convenience, capacity, and reliability.

Optical-media drives have also been around for years, but until recently they've been multithousand-dollar monsters that use expensive nonstandard media. The new, smaller drives are priced at around \$1,500 to \$2,000 and use ISO-standard 3.5-inch 128-megabyte cartridges that cost around \$60 — about half the price of an 88-megabyte SyQuest cartridge. The low cost per megabyte of these drives makes them highly competitive not only with the magnetic-cartridge drives but also with the many tape-backup systems.

Current 3.5-inch optical drives made by Sony and IBM are slightly slower than SyQuest and Iomega drives, but newer mechanisms are expected to eliminate this performance gap within a year. IBM, MOST, Olympus, Panasonic, Ricoh, Sony, TEAC, and Toshiba have already demonstrated 3.5-inch optical mechanisms, and units using these mechanisms should be shipping in quantity by the time you read this. With competition this stiff, prices could drop below the \$1,000 mark within the next 18 months. As prices drop, don't be surprised if you start seeing Macs with these drives built in within another year or two — most mechanisms are designed to fit into

devices, we used the Finder to copy a 10-megabyte folder from an internal drive to a cartridge. To simulate the task of preparing a large DTP file for transport to a service bureau, we used the Finder to duplicate a single 13-megabyte file. Although the Bernoulli 90 drive exhibited a markedly greater throughput in the SCSI Evaluator test, it required 5 to 10 percent more time to copy files than an average SyQuest SQ5110 drive did. Our tests also revealed that the Bernoulli 90's cache had little, if any, effect on performance. When its optional verification feature was turned on, write times were doubled — a small price to pay for the peace of mind that verification provides.



The future? A compact 3.5-inch optical cartridge holds 128 megabytes — more than SyQuest or Iomega cartridges for about half the cost.

the Mac's floppy-disk-drive bay.

Currently, most of these drives are based on an ISO standard requiring a 128-megabyte single-sided disc. The drives use a magneto-optical mechanism similar to those used by manufacturers such as IBM, MOST (which also offers a 256-megabyte version), Ricoh, and Sony. Early signs are that media will be interchangeable among these drives, if the driver software is compatible.

We expect that these small optical drives will increase in capacity and performance in the coming months. As these improvements take place, magnetic-cartridge drives may be replaced by 3.5-inch optical drives as the new standard for removable-media devices.

Of course, SyQuest and Iomega disagree. In fact, when asked about the 3.5-inch-optical threat, a representative from one of

the manufacturers replied, "Just wait till you see what we've got coming down the pipe." It's good to hear that they're preparing to respond to the optical challenge, but what about their current drives? Are the new high-capacity SyQuest and Iomega drives good enough to stand on their own, or are they just swimming in the trough between two technological waves?

— Mark Frost

Not Created Equal

Because these magnetic-cartridge drives' performance is so similar, we tried to differentiate them on the basis of design and construction (see Figure 2). For design, we gave points to drives with niceties such as vertical orientation and extra AC outlets. For construction points, attention to detail, appropriate component choices, and workmanship were significant factors.

Although the majority of these drives can function properly when oriented either horizontally or vertically, we compliment EMAC, Iomega, Liberty, and Optima for providing removable feet that specifically allow vertical mounting. Also, if your computer desk is ensnared in a tangle of cables and

cords, you'll like the APS, Cutting Edge, Ehman, ETC, MacTown, and Mass Microsystems drives, which have AC power outlets on their back panel.

When it comes to overall construction, the EMAC, FWB, Iomega, and Ocean drives deserve top honors. They feature a sturdy, well-designed case and a shielded power supply. This reduces the radio-frequency noise that can interfere with data throughput in the drives' controller boards as well as corrupt the disk itself. The internal wiring is clean and protected by toroids, metalized ceramic EMI (electromagnetic interference) filters. These drives' SCSI cables are three feet or shorter (the shorter the cable, the smaller the signal loss), and they pair individual

signal lines with grounded wires and shield the twisted pairs in foil as well as metal braids to protect them from extraneous interference. Further, SCSI ID and termination can be changed easily without opening the case.

The Loviél and Third Wave drives tied for the ignominy of worst construction. Neither can be positioned on its side, nor do they have extra AC outlets. We could overlook the absence of these conveniences if these units had no other construction shortcomings. However, the Loviél Maxcess 88SYZF has an unshielded plastic case; lacks toroids, an external fuse, and external termination; and comes with a poorly shielded SCSI cable. The Third Wave 88 SR also comes in

a plastic case with an unshielded power supply and lacks toroids, external termination, and an appropriate SCSI-ID selector.

Service and Support Are Key

Magnetic-cartridge drives and their compatibility issues require more attention than do hard-disk drives, and buyers may need a lot of after-sale hand-holding as well as a substantial

complement of easy-to-use software and documentation (see Figure 3). If you're more apprehensive than most users, the PLI Infinity 88, with its strong array of service options, is a good choice. PLI has a toll-free technical-support hot line, maintains a service center and an electronic bulletin board, offers data-recovery services, and warrants its drives for two years.

Of all the drives we examined, the

FWB hammerDisk 88 comes with the most-comprehensive documentation (approximately 300 pages). It's easy to read and offers a wealth of information on drive installation and operation as well as a thorough discussion of SCSI concepts. FWB's Hard Disk Toolkit formatting software is an easy-to-use yet powerful group of utilities that offers so many useful features (such as updating of old drivers,

Table 2: Service and Support

Company	Warranty	Extended warranty	Money-back guarantee	Direct/indirect	Turnaround	Data-recovery service
APS	2 years*	none	30 days	direct	48 hours	\$75/hour (2-hour minimum) — replace parts/software
CMS	1 year [†]	\$175/ year	none	indirect	48 hours	free — replace parts/software [§]
Cutting Edge	2 years [†]	none	none	indirect	no guarantee	none
Ehman	2 years [†]	none	30 days	direct	no guarantee	none
EMAC	2 years [†]	none	none	indirect	72 hours	none
ETC	1 year*	none	30 days	direct	no guarantee	\$50 — replace parts/software
FWB	2 years [†]	none	none	indirect	48 hours	free
HDI	1 year [†]	\$63/ year	30 days	direct	no guarantee	none
Iomega	1 year*	\$129/year	none	direct/indirect	yes [§]	\$300 minimum; \$100/hour after 3 hours
Liberty	1 year*	none	30 days	direct	48 hours	\$50/hour
Loviél	1 year*	none	none	direct/indirect	no guarantee	none
MacProducts	2 years*	none	30 days	direct	no guarantee	free under warranty**
MacTel	2 years*	none	none	direct	48 hours	free — replace parts/software
MacTown	1 year [†]	none	30 days ^{††}	direct	24 hours ^{§§}	none
Mass Microsystems	2 years [†]	none	none	direct	no guarantee ^{¶¶}	none
MicroNet	1 year [†]	\$129/year	none	direct/indirect	48 hours	none
Ocean Microsystems	2 years*	none	none	direct/indirect	48 hours	none
Optima	1 year [†]	\$200/3 years	30 days	direct	48 hours	free — replace parts/software
PLI	2 years*	\$120/year	30 days	direct/indirect	no guarantee	free — replace parts/software
Procom	1 year*	\$199/year***	none	direct/indirect	48 hours	none
Relax	2 years [†]	none	30 days	direct	48 hours	none
Third Wave	2 years [†]	none	30 days	direct	48 hours	free for 1/2 hour, \$40/hour — replace parts/software
Tulin	2 years*	\$50/year	none	direct	48 hours	\$50/hour — replace parts/software

*Manufacturer's warranty.

[†]Dealer-backed warranty.

[§]If out of warranty, will recommend data-recovery service or quote price for in-house recovery service.

[¶]Bernoulli Express is a 24-hour-turnaround service within the warranty period (domestic U.S.).

**Out-of-warranty charges: \$50 for the attempt, \$100 if successful.

^{††}If there's a problem within one year, you get a new drive.

^{§§}Turnaround time depends on how the drive was initially shipped.

^{¶¶}If under warranty, 24-hour turnaround time, but will send you a refurbished drive, not yours. If you want your drive, 3 to 5 days.

***You can also purchase an overnight-repair guarantee for \$75/year.

Table 2: SyQuest offers a one-year warranty on its mechanisms but frequently helps users beyond this limit, and some manufacturers offer separate support of their subsystems above and beyond that warranty. Others also offer extended warranties beyond that — for a price. We

recommend that you seek the security of a 30-day money-back guarantee. Manufacturers who sell direct often offer better prices, but dealers offer the benefit of a local shop to which you can bring your drive for repair.

disk optimizing, performance testing, and even low-level modification of your drive's structure that can enhance the drive's performance) that it borders on overkill for average users.

Too Little, Too Late?

After poring over the test and inspection results, we didn't need long to draw a few unanimous conclusions about these new magnetic-cartridge drives. For one, Iomega and SyQuest are to be commended for the improved capacity and performance of their new Bernoulli 90 and SyQuest SQ5110 drives. But these new drives are inappropriate for a large segment of the market. If you need to exchange data with users who have only the older-model drives, you'll be out of luck — the new drives can't write to the older, smaller-capacity cartridges. If backward compatibility is not an issue — perhaps you need additional storage or plan to make good on your pledge to back up religiously — these drives regain some of their luster.

If you're willing to wait a few months, perhaps the best choice is not to buy a magnetic-cartridge drive at all. A new removable-media mechanism based on lightweight 128-megabyte, 3.5-inch optical discs is poised to usher in a new era of high-capacity removable-storage devices (see Power Tools, December '91, page 227, and the "3.5-Inch Solution" sidebar). If these new optical drives are as fast, reliable, and compatible as their makers claim — and we see no reason to doubt this — the dominance of magnetic-cartridge drives may be over. There is also good news for SyQuest and Iomega partisans: Mass acceptance of 3.5-inch optical drives may push down the price of magnetic-cartridge drives to less than their current bargain levels. But if your needs are pressing and you want our recommendation on which of these magnetic-cartridge drives to buy, see "The Bottom Line."

Owen W. Linzmayer is a San Francisco-based freelance writer. He's written so frequently for *MacUser* that he's run out of clever three-line biographies.

The Bottom Line



Our five choices for top high-capacity removable-cartridge drives (clockwise from top): The Iomega Bernoulli 90, ETC 88R Removable Drive, APS SyQuest 88 MB Drive, PLI Infinity 88, and FWB hammerDisk 88.

Magnetic-cartridge drives offer infinite capacity and convenient data transport as well as advantages over hard drives for backup, archiving, and security. But if you buy one, you'll have to face slow performance and, for some drives, questionable reliability.

As with most purchases, which magnetic-cartridge drive you buy depends on your particular set of needs and resources. For those who can't wait for a 3.5-inch optical drive and for whom compatibility with 44-megabyte SyQuest cartridges isn't important, we recommend the **Iomega Bernoulli 90** (\$1,149 list; \$789 street). It's competitive in price and performance with the new SyQuest 5110 drives and is based on a mature technology that's highly regarded for its reliability.

The 90-megabyte Iomega cartridges are robust and can withstand far greater abuse than can SyQuest cartridges — something to consider if you routinely entrust hyped-up bike messengers or overzealous overnight couriers to transport your data between sites. Furthermore, the Bernoulli 90 drive is housed in a solid plastic case with EMI shielding and is excellently constructed. To top it off, Iomega loads its cartridge up with 33 megabytes' worth of demaware.

If you must have the ability to read others' SyQuest cartridges, there are several 88-megabyte drives that are worthy of consideration. The **FWB hammerDisk 88** is the Cadillac of the lot and is priced accordingly (\$1,799 list; \$1,180 street). FWB's

attention to detail makes the hammerDisk 88 reign supreme when it comes to construction. The bundled Hard Disk Toolkit software is superlative to the point of bordering on overkill (it costs \$200 if you purchase it separately).






If the hammerDisk's price gives you an advanced case of sticker shock, consider the **\$599 ETC 88R Removable Drive**. It's the least expensive magnetic-cartridge drive around but still boasts decent speed, service, ergonomics, and construction. The paltriness of its software and documentation is its major shortcoming.

Concerned about service and software? Then the **PLI Infinity 88** (\$1,199, list; \$898, street) is for you. PLI offers the most extensive array of service options of any SyQuest SQ5110 drive. The Infinity 88 also comes bundled with 18 megabytes of public-domain software and a nice suite of backup, optimization, cache, and print-spooling utilities.

Finally, take a look at the **APS SyQuest 88 MB Drive** (\$899 direct). It's well built, can be oriented vertically, and features extra AC outlets. Its Power Tools software includes useful help screens and a straightforward interface that novices can appreciate.

As we went to press, SyQuest announced two new products: a 42-megabyte, 2.5-inch drive and a 105-megabyte, 3.5-inch drive. Both drives were originally designed for DOS machines with an AT interface, but SCSI versions should be right behind. The new 3.5-inch drive may well make all these current SyQuest drives obsolete.

Table 3: Features of Magnetic-Cartridge Drives

					
● = yes ○ = no	APS SyQuest 88 MB Drive ⚡⚡⚡	CMS Platinum 88MB ⚡⚡½	Cutting Edge 88MB Removable ⚡⚡½	Ehman 88 MB Removable ⚡⚡½	EMAC Metro 88R ⚡⚡½
List price	\$899	\$1,499	\$1,345	\$845	\$1,479
Street price	\$899	\$959	\$845	\$845	\$1,252
Pros	Good construction.	Good software bundle. Good documentation.	Good SCSI cable.	Good SCSI cable.	Removable feet for vertical orientation.
Cons	Poor SCSI cable.	Poor construction. Poor SCSI cable. DIP-switch SCSI ID.	Poor documentation. No bundled software. Internal termination.	Poor documentation. No bundled software. Internal termination.	Expensive.
Hardware					
Mechanism	SyQuest SQ5110	SyQuest SQ5110	SyQuest SQ5110	SyQuest SQ5110	SyQuest SQ5110
Cartridges included	1	1	1	1	1
Capacity	88/83 MB	88/84 MB	88/85 MB	88/85 MB	88/84 MB
SCSI-ID selector	push button	DIP switch	push button	push button	push button
SCSI termination	external	external	internal	internal	external
Cable	2.5 feet, 50/25-pin	3 feet, 50/25-pin	2 feet, 50/25-pin	2 feet, 50/50-pin	2 feet, 50/50-pin
Fuse	external	internal	external	external	external
UL/CSA-approved	CSA	●	●	●	●
FCC-approved	●	●	●	●	●
AC outlet	2	○	2	2	○
Upgrade from 44 MB	○	○	○	○	○
Driver software					
Partitioning	●	●	○	○	●
Backup	○	●	●	●	○
Password protection	●	●	○	○	●
Data encryption	○	●	○	○	○
Data recovery	○	●	○	○	○
Disk optimizer	○	●	○	○	○
Diagnostics	○	●	●	●	○
Mounter	extension	extension	extension	extension	extension
Public-domain software	18 MB	○	○	○	○
Other					
Dimensions (L x W x H)	10 x 9.5 x 2.5 in.	10.5 x 10 x 3 in.	10.5 x 10 x 2.5 in.	10.5 x 10 x 2.5 in.	11 x 10 x 3 in.
Weight	7 lb	7 lb	6 lb	6 lb	7 lb
Case material	metal	metal	metal	metal	plastic
Indicators	access, power	access, power	access, power	access, power	access, power
Company	APS 2900 S. 291 Hwy. Independence, MO 64057 (800) 235-2750 (816) 373-5800	CMS Enhancements 2722 Michelson Dr. Irvine, CA 92713 (714) 222-6000	Cutting Edge 97 S. Red Willow Rd. Evanston, WY 82931 (307) 789-0582	Ehman Engineering, Inc. 97 S. Red Willow Rd. Evanston, WY 82931 (800) 257-1666 (307) 789-3830	EMAC 48431 Milmont Dr. Fremont, CA 94538 (800) 821-0806 (510) 498-1111

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CIRCLE 172 ON READER SERVICE CARD.

Table 3: Features of Magnetic-Cartridge Drives, continued

					
● = yes ○ = no	ETC 88R Removable Drive ★★★★	FWB hammerDisk 88 ★★★★	HDI PowerDrive Removable 88MB ★★★★½	Iomega Bernoulli 90 ★★★★	Liberty 88MB Removable Drive ★★★★½
List price	\$599	\$1,799	\$899	\$1,149*	\$1,199
Street price	\$599	\$1,180	\$899	\$789	\$699
Pros	Least expensive.	Good construction. Good documentation and software.	Toll-free phone support.	Good construction. Good support. Good documentation. Good SCSI cable.	Inexpensive. Good design.
Cons	Minimal software bundle. Poor documentation. Minimal support.	Expensive.	Internal termination. Poor construction.	Lack of compatibility with most service bureaus.	Minimal support. Poor construction.
Hardware					
Mechanism	SyQuest SQ5110	SyQuest SQ5110	SyQuest SQ5110	Bernoulli 90	SyQuest SQ5110
Cartridges included	1	1	1	1†	none
Capacity	88/85 MB	88/84 MB	88/80 MB	90/90 MB	88/83 MB
SCSI-ID selector	push button	push button	push button	push button	thumb wheel
SCSI termination	external	external	internal, accessible	external, switchable	external
Cable	2 feet, 50/25-pin	1.5 feet, 50/25-pin	1.5 feet, 50/25-pin	6 feet, 50/50-pin	3 feet, 50/50-pin
Fuse	external	external	internal	internal	internal
UL/CSA-approved	●	●	●	●	○
FCC-approved	●	●	●	●	●
AC outlet	2	○	○	○	○
Upgrade from 44 MB	\$599	○	○	\$725	\$600
Driver software					
Partitioning	○	●	●	●	●
Backup	○	○	○	●	○
Password protection	○	●	○	○	○
Data encryption	○	●	○	○	○
Data recovery	○	○	○	○	○
Disk optimizer	○	○	○	○	○
Diagnostics	●	●	○	●	●
Mounter	extension	control panel, extension	extension	control panel	control panel, extension
Public-domain software	○	○	○	33 MB	○
Other					
Dimensions (L x W x H)	9.5 x 9.5 x 2.5 in.	9.75 x 9.5 x 2 in.	10 x 10 x 2.5 in.	10 x 10 x 3 in.	9 x 6.5 x 2 in.
Weight	7 lb	7 lb	4 lb	8 lb	4 lb
Case material	metal	metal	metal	metal	metal
Indicators	access, power	access, power	access, power	access, power	access, power
Company	ETC Peripherals Corp. 5426 Beaumont Ctr. Blvd. Tampa, FL 33634 (800) 882-2863 (813) 884-2863	FWB 2040 Polk St., Ste. 215 San Francisco, CA 94109 (415) 474-8055	Hard Drives Int'l 1912 W. Fourth St. Tempe, AZ 85281 (800) 767-3475 (602) 350-1128	Iomega Corp. 1821 W. 4000 S. Roy, UT 84067 (800) 777-6618 (801) 777-1000	Liberty Systems 160 Saratoga Ave., Ste. 38 Santa Clara, CA 95051 (408) 983-1127

* Requires a Mac Interface Kit for \$49 (includes Central Point's Backup software) or \$129 (includes Dantz Development's Retrospect software).

† A free cartridge is mailed to you when you return the warranty card.

Corporate Takeover



Bernoulli® and SyQuest... each is trying to take over the corporate world with their special technology for removable media. Who will be the winner? You will, if you choose the ETC DataPort™.



Besides offering SyQuest and Iomega drives as options in the ETC DataPort, ETC Peripherals provides a full line of storage peripherals and memory upgrades for your Macintosh®.

Start with the DataPort cartridge. It's a 3 1/2" Winchester drive in a removable cartridge. Just like removable disks, the DataPort cartridge can be removed for storage, or carry it to another location. Better than a removable disk, our cartridges can access your data faster, and it's available in greater capacities ranging from 105 Mb to 1.0Gb. And, with our exclusive ETC Tools, you can even combine several smaller drives into a single, super volume—up to 2.1 Gb!

Next pick your system... the DataPort Twin with 2 drives or the Tower with 4. Fill the slots with DataPort cartridges and either a Bernoulli or SyQuest drive. Need something special? We can configure any combination you need.

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ETC Peripherals, 5426 Beaumont Center Boulevard, Suite 300, Tampa, FL 33634, (800) 882-2863, (813) 884-2863, Fax: (813) 888-9535

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CIRCLE 86 ON READER SERVICE CARD.

Table 3: Features of Magnetic-Cartridge Drives, continued

					
● = yes ○ = no	Loviél Maxcess 88SYZF \$\$\$	MacProducts Magic 88 \$\$\$½	MacTel Index 88R \$\$\$½	MacTown DataStor 88 \$\$\$½	Mass Microsystems DataPak 88 \$\$\$½
List price	\$1,126	\$899	\$899	\$899	\$1,799
Street price	\$999	\$899	\$899	\$899	\$979
Pros		Good support. Good documentation.	Good support. Good documentation and software bundle.	Good design. Good construction.	Good documentation. Good software bundle.
Cons	Minimal support. Poor design. Worst construction. Internal termination.	Poor SCSI cable.	Poor design. Poor SCSI cable. Internal termination.	Internal termination.	
Hardware					
Mechanism	SyQuest SQ5110	SyQuest SQ5110	SyQuest SQ5110	SyQuest SQ5110	SyQuest SQ5110
Cartridges included	1	none	1	1	1
Capacity	88/83 MB	88/84 MB	88/88 MB	88/88 MB	88/85 MB
SCSI-ID selector	push button	push button	push button	push button	push button
SCSI termination	internal	external	internal	internal	external
Cable	2 feet, 50/25-pin	3 feet, 50/25-pin	2 feet, 50/25-pin	2 feet, 50/25-pin	2 feet, 50/25-pin
Fuse	internal	internal	external	external	external
UL/CSA-approved	●	●	●	○	○
FCC-approved	●	●	●	○	●
AC outlet	○	○	○	2	2
Upgrade from 44 MB	○	\$499	○	○	○
Driver software					
Partitioning	●	●	●	●	●
Backup	●	○	●	○	○
Password protection	●	●	●	○	●
Data encryption	●	○	○	○	○
Data recovery	●	○	○	○	○
Disk optimizer	○	○	○	○	○
Diagnostics	●	●	●	○	○
Mounter	control panel	DA	extension	○	extension
Public-domain software	○	○	14 MB	○	○
Other					
Dimensions (L x W x H)	10 x 10 x 3 in.	10 x 10 x 2.5 in.	10 x 10 x 2.5 in.	10 x 10 x 2.5 in.	10 x 10 x 3.5 in.
Weight	6.5 lb	7.5 lb	4.25 lb	7.5 lb	7 lb
Case material	plastic	metal	plastic	metal	plastic
Indicators	access, power	access, power	access, power	access, power	access, power
Company	Loviél Computer Corp. 5174 W. 76th St. Edina, MN 55439 (612) 835-3553	MacProducts USA 708 W. 22nd St. Austin, TX 78705 (800) 622-3475 (512) 472-8881	MacTel Technology 3007 N. Lamar Austin, TX 78705 (800) 950-8411 (512) 451-2600	MacTown 5718 Central Ave. Boulder, CO 80301 (800) 338-4273 (303) 442-4747	Mass Microsystems, Inc. 810 W. Maude Ave. Sunnyvale, CA 94086 (800) 522-7979 (408) 522-1200

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Welcome to the next generation of removable storage, the new Bernoulli® 90 from Iomega®.

At 90 megabytes per removable disk, we've more than doubled our capacity. Yet the new Bernoulli 90 is actually less expensive than our own Bernoulli 44, as well as other removable-disk drives. A lot less. And a lot faster, too.

But the best part is, it's all Bernoulli. Rugged, reliable, endless storage—exactly what storage-intensive Macintosh users demand.

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The new Bernoulli 90 is now considerably less expensive than other removable drives of similar capacity. Granted, competitive pricing alone doesn't necessarily mean value—so consider what

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You don't get a new, 19-msec effective access time. You don't get a technology that frees you from head crashes, or removable disks that can stand 1,000Gs of shock.

You don't get a drive that's compatible with every major operating system, and workstations. And you don't get Central Point's MacTools Deluxe or Dantz's Retrospect software.

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Leading publications have given us welcome recognition, but with a 98 percent satisfaction rate, our



Welcome to the 90s.

biggest supporters are Bernoulli users.

Our users enjoy worldwide support and a 24-hour* drive replacement service. To further protect their investment, we've designed the Bernoulli 90 to read 44MB disks. And we're instituting an upgrade program to help get every Bernoulli user into the 90s.

Call 1-800-777-6303!

Questions? We don't blame you. There's a lot more you should know about—like our free, 90MB disk offer, drive configurations, Bernoulli Technology®, and specific pricing. So we've prepared a free brochure that's yours with a phone call. Find out today what a welcome change Bernoulli can be. Before the 90s leave you behind.

ΩMEGA®
Makers of Bernoulli



Table 3: Features of Magnetic-Cartridge Drives, continued






					
● = yes ○ = no	MicroNet 88 MB Removable \$\$\$½	Ocean Voyager 88 \$\$\$½	Optima Diskovery 88R \$\$\$½	PLI Infinity 88 \$\$\$\$	Procom MRD 88 \$\$\$½
List price	\$1,395	\$1,595	\$1,295	\$1,199	\$899
Street price	\$949	\$995	\$999	\$898	\$650
Pros	Good SCSI cable.	Good construction. Good documentation. Good SCSI cable.	Good SCSI cable. Good documentation. Vertical positioning.	Good support. Good software bundle.	Inexpensive.
Cons	Minimal support.	Minimal software bundle.			Minimal support.
Hardware					
Mechanism	SyQuest SQ5110	SyQuest SQ5110	SyQuest SQ5110	SyQuest SQ5110	SyQuest SQ5110
Cartridges included	1	1	1	1	1
Capacity	88/84 MB	88/82 MB	88/85 MB	88/85 MB	88/83 MB
SCSI-ID selector	push button	push button	push button	dial	dial
SCSI termination	external	external	external	external, switchable	external
Cable	3 feet, 50/50-pin	1.5 feet, 50/25-pin	2 feet, 50/25-pin	1.5 feet, 50/25-pin	2 feet, 50/25-pin
Fuse	internal	external	internal	external	internal
UL/CSA-approved	○	○	●	●	●
FCC-approved	●	●	●	●	●
AC outlet	○	○	○	○	○
Upgrade from 44 MB	○	○	○	●	○
Driver software					
Partitioning	●	●	●	●	●
Backup	○	●	○	○	○
Password protection	●	●	●	○	●
Data encryption	○	●	○	○	○
Data recovery	○	●	●	●	○
Disk optimizer	○	●	○	●	○
Diagnostics	○	●	●	●	○
Mounter	○	control panel	DA, extension	●	extension
Public-domain software	○	○	○	15 MB	○
Other					
Dimensions (L x W x H)	11 x 10 x 3 in.	10.5 x 10 x 3.5 in.	11.5 x 10 x 2.5 in.	10 x 10 x 2.5 in.	10.5 x 9.5 x 2.5 in.
Weight	7 lb	9 lb	7.75 lb	4.5 lb	7 lb
Case material	metal	metal	plastic	metal	plastic
Indicators	access, power	access	access, power	access, power	access, power
Company	MicroNet Technology 20 Mason Irvine, CA 92718 (714) 837-6033	Ocean Microsystems 2469 Hacienda Ave. Campbell, CA 95008 (800) 262-3261 (408) 374-8300	Optima Technology 17526 Von Karman Ave. Irvine, CA 92714 (714) 476-0515	PLI 47421 Bayside Pkwy. Fremont, CA 94538 (800) 288-8754 (510) 657-2211	Procom Technology 200 McCormick Ave. Costa Mesa, CA 92626 (800) 800-8600 (714) 549-9449

Table 3: Features, continued




			
● = yes ○ = no	Relax Vista 88R ‡‡‡½	Third Wave 88 SR ‡‡‡½	Tulin A-Hive 88R ‡‡‡½
List price	\$799	\$799	\$819
Street price	\$799	\$799	\$649
Pros	Good documentation.	Good support.	Inexpensive.
Cons	Poor SCSI cable.	Poor design. Poor construction. Poor SCSI cable. Internal termination.	Minimal support. Poor documentation. Poor design. Poor software bundle.
Hardware			
Mechanism	SyQuest SQ5110	SyQuest SQ5110	SyQuest SQ5110
Cartridges included	1	1	1
Capacity	88/83 MB	88/84 MB	88/84 MB
SCSI-ID selector	push button	thumb wheel	push button
SCSI termination	external	internal	external
Cable	2 feet, 50/25-pin	2 feet, 50/25-pin	3 feet, 50/25-pin
Fuse	internal	external	external
UL/CSA-approved	○	●	○
FCC-approved	●	●	●
AC outlet	○	○	○
Upgrade from 44 MB	○	○	○
Driver software			
Partitioning	○	●	●
Backup	○	○	○
Password protection	○	●	○
Data encryption	○	○	○
Data recovery	○	○	○
Disk optimizer	○	○	○
Diagnostics	○	●	○
Mounter	control panel, extension	DA, extension	○
Public-domain software	○	○	○
Other			
Dimensions (L x W x H)	11.25 x 10.25 x 2.5 in.	10 x 10 x 2.5 in.	10 x 10 x 4.5 in.
Weight	6 lb	8 lb	11 lb
Case material	metal	plastic	metal
Indicators	access, power	access, power	access, power
Company	Relax Technology 3101 Whipple Rd. Union City, CA 94587 (510) 471-6112	Third Wave Computing 1826B Kramer Ln. Austin, TX 78758 (800) 284-0486 (512) 832-8282	Tulin 2156H O'Toole Ave. San Jose, CA 95131 (408) 432-9025

Table 3 Criteria

Cartridges included — The number of cartridges that are included with the drive.

Capacity — Unformatted/formatted storage capacity of one cartridge (in megabytes).

SCSI-ID selector — Type of switch used to change the device's SCSI address.

SCSI termination — Describes where the termination switch is located if there is a switch. If it is internal, users may have to open the drive's case.

Cable — Length in feet and number of pins on each connector.

Fuse — All these drives have an internal fuse. Some also have external fuses, and some of these also come with spare fuses for replacing blown ones.

UL/CSA-approved — Does the unit meet the standards set by Underwriters' Laboratories and/or the Canadian Standards Association?

FCC-approved — Does the unit meet the standards set by the Federal Communications Commission?

AC outlet — Does the device have an AC power outlet? If more than one, how many?

Upgrade from 44 MB — Does the manufacturer offer an upgrade path to users who own the 44-megabyte version of its drive?

Partitioning — Does the driver software let you create disk partitions in your cartridges?

Backup — Does the software back up your cartridges?

Password protection — Does the software let you password-protect folders or partitions on your cartridges' disk?

Data encryption — Does the software allow you to secure files by using data encryption?

Data recovery — Does the software offer ways of recovering lost data?

Disk optimizer — Does the software let you optimize your cartridges' disk by placing applications on contiguous segments of the disk?

Diagnostics — Does the software let you run diagnostic tests to troubleshoot problems with a cartridge?

Mounter — The type of program that initiates the driver software.

Public-domain software — Does the vendor include public-domain software on its cartridge?

Raise Your Standards!



Infinity 88 Turbo Removable Cartridge Drive

For years now, 45MB cartridge drives have been the de-facto standard removable media drive. Many hundreds of thousands of these drives are in use throughout the world. And PLI has shipped more of these drives than any other integrator.

But today, a 45MB cartridge just isn't big enough. For that reason, among others, a new standard is being established — 88MB cartridges. And once again, PLI is setting the standard. That standard is the Infinity 88 Turbo.

More Capacity

The demands for high-capacity data storage have increased steadily. Power users need it for virtual memory. Artists and publishers need it for graphics and typefaces. Everybody needs it for System 7. Today, nearly every Macintosh user needs 80MB or more.

Higher Reliability

Over the years, drive technology has improved. Reliability is much better. The Infinity 88 Turbo offers a 60,000 hour MTBF rating, twice that of the smaller drives. To emphasize that increased reliability, the drives come with a two-year warranty.

Faster Performance

The new 88MB drives are faster than the 45's. They support both synchronous and asynchronous data transfer and do so at higher rates of speed. A look-ahead cache has been added to improve access times as well.

Save Money

And there's more good news. The Infinity 88 Turbo drives are faster, bigger and more reliable than earlier drives, but cost only a few dollars more. In fact, the cost-per-megabyte is less for the 88MB drives!

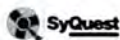
Buy from the World Leader

PLI has been at the forefront of removable media technology for five years and is well known for the high quality of its products. Our software is known for its speed and reliability. PLI's award-winning drive subsystems are built from the best components available, tested thoroughly (including a burn-in period of at least 24 hours) and certified by UL and FCC.



Standardize

Personal computer users all over the world are moving up to the 88MB cartridges. They are the new standard in removable media. And in order to use the 88MB cartridges, you need an 88MB drive like the Infinity 88 Turbo. Don't get left behind. Call PLI today.



* The media included with the drive has a five-year warranty. Additional media may be purchased with either one or five year warranties. All company names and product names are the property of their respective holders.

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CIRCLE 174 ON READER SERVICE CARD.



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"I've been in this business for six years, and I've NEVER been this excited about printers!"

PostScript® Level 2 is the next generation of Adobe's page description language. The new release contains a number of significant performance, function, and print quality enhancements. It's compatible with all current applications which support the PostScript® language.

Best of all, the time-saving features of PostScript® Level 2 are available RIGHT NOW in our RealTech Laser and RealTech Laser 400:

- **IMPROVED MEMORY MANAGEMENT.** One pool of memory is available for all resource needs. Dynamically allocated and automatically reclaimed; no arbitrary memory restrictions exist. Disk space management is improved to eliminate fragmentation and improve transfers of information from the hard disk to RAM.

- **ATM FONT RENDERING TECHNOLOGY.** Raw characters are built 4 to 5 times faster.

Features available through software applications:

- **COMPRESSION.** Reduce transmission time and save disk space by sending compressed files directly to your printer.

- **FORMS SUPPORT.** You can define a base form whose representation stays cached in the printer. Then only the information that changes between forms needs to be interpreted.

- **COMPOSITE FONTS.** Provides the capability to handle very large character sets and non-horizontal writing modes."

Tired of hopping up and down to change the paper in your printer? With our RealTech Laser, you can specify up to 4 paper changes without moving anything but your mouse!



RealTech Laser	QMS 810 Turbo w/HD	Apple NTX w/HD	QMS 410	TI Micro-Laser 35	Apple PDS II LaserWriter
Street prices:					
\$1995	\$3995	\$4295	\$1995	\$1649	\$1995

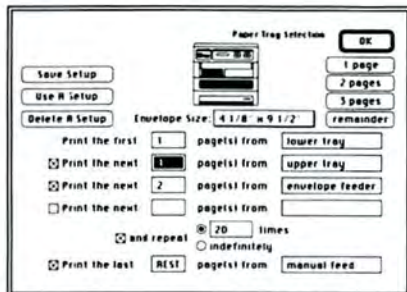
On average, the RealTech Laser performed 4 to 5 times faster than other non RISC-based laser printers in its price range.

\$1995!

Versatile, with PC compatibility; its 3 interface ports can be used at the same time. Includes Appletalk® RS-422, IBM PC parallel, and RS-232-C serial interface ports (can be assigned either PostScript® or LaserJet II commands). Auto switches between interfaces, and spools files on a real-time basis. A Hewlett-Packard LaserJet Series II emulation allows use with non-PostScript® applications software.

2 Mb RAM, upgradable to 10 Mb! The only printer of its kind with this much RAM and hard disk expansion capability. Includes a SCSI port for a hard disk and 35 resident PostScript® typefaces. Compact design (only 33.5 lbs.; measures 13.4"W x 14.2"D x 10.9"H).

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- **9 pages/minute**
- **2 paper trays**

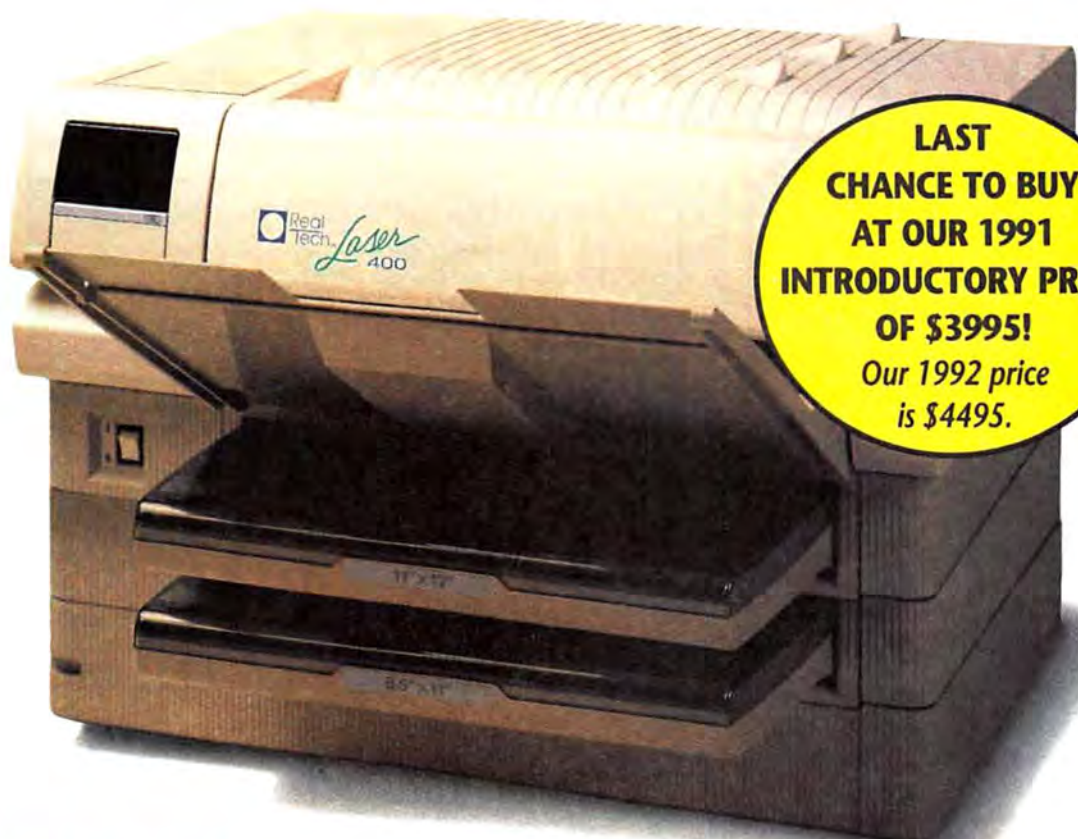


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11x17**

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3. *What are its memory capabilities?*

The RealTech Laser 400 has 4 Mb RAM, upgradable to 16 Mb! *Includes a SCSI port for a hard disk* and 35 resident PostScript® typefaces. Compact design (measures 20.25"W x 16"D x 11.75"H; weighs 80.5 lbs). Comes with two trays and manual feed as standard features (optional bypass feeder available).

- 8 ppm (11x17)
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- RISC processor
- 2 printer trays
- 20,000 pages per month duty cycle



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LEVEL 2

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For speed and performance, they're based on a RISC-based (Reduced Instruction Set Computing) processor and PostScript® Level 2 software from Adobe.

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SCSI Powercard.....	979

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TI MicroLaser™ PS 17. 300 dpi with HP LaserJet Series II emulation standard. 1.5 Mb RAM. Six pages per minute; 17 resident fonts; 3,000 pages per month duty cycle. Optional accessories: 2nd paper tray, separate envelope tray.

\$1249



NEW! TI TurboLaser™. 300 dpi with Adobe PostScript Level 2 and RISC-based processor. 2.5 Mb RAM. Nine pages per minute; 35 resident fonts; 10,000 pages per month duty cycle. Optional accessories: 2nd paper tray, SCSI interface.

\$1939

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CPU	Monitor	Price
Mac SE, SE30	Mono	\$995
Mac II, IIcx, IIci, IIx, IIfx	Mono	\$995
Mac II, IIcx, IIci, IIx, IIfx	GS 256	\$1479
Mac IIsi	Mono	\$1059
Mac Portable	Mono	\$1249

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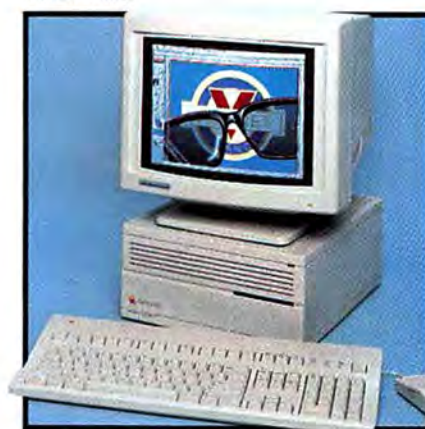
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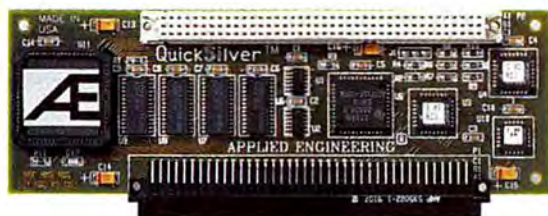
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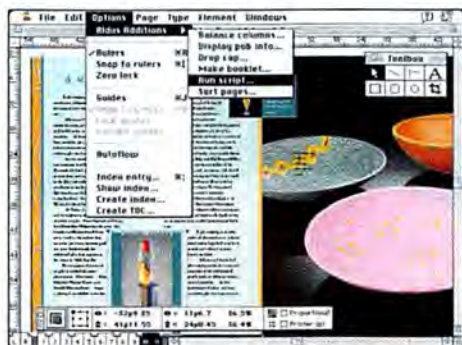
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Accurate color proofing on a ColorScript 100? QMS and Kodak are comarketing Precision CPCS (\$495), software that brings device-level color calibration to the ColorScript 100 family of printers. The software is optimized for accurate reproduction of continuous-tone images, and it works transparently. Just download it to the printer's hard disk, and forget it. The companies claim that you'll now have accurate, consistent color output — good enough for prepress proofing — no matter which applications you use.

By Aileen Abernathy



As the page turns: At the fall Seybold show, Aldus came out swinging, voicing a new commitment to customer needs and taking aim at archrival Quark. Version 4.2 of PageMaker has the usual quota of enhancements, such as interruptible screen redraw, a Control palette for numerically scaling page elements, baseline leading, and support for System 7's subscribe function. But the real crowd pleasers were its six Addition modules (including Drop Caps, Page Sorter, and Run Scripts), a hot link to FreeHand 3.1 (Option-double-clicking on a placed illustration launches FreeHand), and the bundling of PrePrint 1.5 at no additional cost. The list price remains \$795 (upgrades are \$85 with PrePrint, \$75 without). Suddenly, PageMaker is a better buy than QuarkXPress. Aldus also preannounced that some long-overdue features will be in the 1992 edition of PageMaker — multiple open documents, incremental rotation of text and graphics, grouping, internal color separations, and improved printing.

Fonts of the future: Adobe's first Multiple Master typefaces should hit the streets any day now. Both Minion (\$470) and Myriad (\$370) have roman and italic versions and are bundled with a selection of primary (precreated) fonts and a font-creator tool for making additional variations. Minion has three design axes — weight, width, and optical scaling (6 to 72 points) — and provides 14 primary fonts right out of the box. Myriad (a sans-serif design) supplies weight and width axes and has 30 fonts before you start tinkering. The first third-party vendor to join the action is ITC, which is developing a Multiple Master version of Bodoni in cooperation with Adobe and Xerox. ETA: late 1992.



Gee-whiz graphics: Aldus FreeHand 3.1 has more than 40 enhancements, the coolest being its pressure-sensitive freehand tool. You can draw a free-form line of varying thickness — just as in a painting program — using a Wacom digitizing tablet or the keyboard (left). When you've finished, the line turns into an object, complete with points. What do posters for *Naked Gun 2½* and some print ads for Budweiser have in common? They were both created with the Quantel Paintbox, the industry standard for high-end color work. Now Quantel ([203] 656-3100) has announced "the ultimate Mac peripheral": the Desktop Paintbox, a Mac-integrated version of its proprietary hardware and software. The \$100,000+ setup offers loads of sophisticated image-editing features and can manipulate a 45-megabyte color photo in real time.



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Page Elements with Style

You can add effective, eye-catching graphics to your publications without importing anything. Just use the tools already available in your page-layout program.

By Janet Ashford

It's easy to import art, either a scanned image or an illustration created in another application, into a page layout. So easy, in fact, that many people forget that graphics tools are available *within* their page-layout programs. Basic geometric shapes, sophisticated drawings, and rich textures — they can all be created from simple components such as lines, squares, circles, and polygons. These elements (and sometimes more) are available in most page-layout programs, including PageMaker, QuarkXPress, DesignStudio, FrameMaker, Ready,Set,Go!, Ventura Publisher, Publish It! Easy, and Personal Press. A few programs even have image-editing features that let you add some extra punch to imported graphics.

For those who need to create complex illustrations or manipulate scanned photographs, a specialized graphics application is essential. But with a good eye and a few simple techniques, you can also design and illustrate entire publications (or just portions thereof) without the need — or expense — of an artist's skills or additional graphics software.

Basic Geometry

The basic elements of page ornament — lines, rectangles, and circles — are available in all page-layout programs. Lines usually come in several styles and weights; they can set off headlines and subheads and create column rules and borders. Geometric shapes can be used as outlines or be filled with gray tones, color, or (in some programs) textures. They can be used singly or in combinations to highlight paragraphs, provide background for headlines, or set off sidebars.

Designing pages with only circles, squares, and lines can be limiting, however. Some programs — QuarkXPress, DesignStudio, FrameMaker, and Publish It! Easy, for example — provide a polygon tool that enables you to draw almost any straight-sided object that can be created in a drawing program. Many programs also let you rotate graphic objects and type, either freely or in specific increments.

By combining all these elements, you can create original artwork — illustrations, posters, even book covers — without leaving your



Figure 1: Everything on this newsletter page was created by use of the tools available in QuarkXPress. The simple geometric elements were drawn and positioned manually, and the cityscape at lower left was composed of overlapping circles, rectangles, and lines. The telephone was drawn with the polygon tool. The yellow squares that set off each subhead are anchored graphics that flow with the text. The text-runaround feature was used to wrap text around the large yellow circle, and to crop the circle, it was positioned to bleed off the page.

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Figure 2: The polygon tool, available in many page-layout programs, lets you create a variety of simple and complex shapes. The resulting graphics can be used as individual decorative elements, such as the telephone in Figure 1, or can be combined to create illustrations. Here, I used DesignStudio's polygon tool to draw a tulip and leaves for a poster. The tulip was copied and the duplicates were aligned by use of nonprinting guidelines, to create the look of a quilt pattern. Type, bright colors, and a border composed of small circles and squares complete the design.

page-layout application. The page design in Figure 1 demonstrates how effective the use of simple shapes can be. Every element on the page was created with the graphics tools available in QuarkXPress, including the telephone (polygon tool) and cityscape (overlapping circles, rectangles, and lines). Using the polygon tool in DesignStudio, I created a poster-style illustration that duplicates the look of a quilt pattern (see Figure 2). You can use this line-segments technique to produce simple spot art that depicts such everyday objects as plants, animals, food, vehicles, machinery, furniture, and office equipment (see the telephone in Figure 1).

In most page-layout applications, the graphics capabilities end here. A few programs, however, include even more of the features normally found in a drawing or painting program. Publish It! Easy, for example, offers more than a dozen tools — including the paintbrush, freehand, and fill-pattern tools — for creating bit-mapped and object-oriented graphics. FrameMaker provides a Bézier-curve tool similar to those found in Illustrator and FreeHand.

Anchored Graphics

PageMaker, QuarkXPress, FrameMaker, and Ventura Publisher let you attach graphics (either imports or ones you've created in the program) to text blocks as *in-line*, or *anchored*, graphics. Anchored graphics flow with the type so that, for example, a figure always stays with the text that refers to it, even when editing changes cause the text to move to

another position. For the newsletter page layout in Figure 1, I drew a yellow square and pasted it into the text just before the first letter of each subhead. These anchored squares stayed with the subheads no matter where they moved within the document.

PageMaker and QuarkXPress also allow you to anchor a rule to text by defining it as part of a style sheet or paragraph specification. Their Paragraph Rules dialog boxes let you define the length, width, style, and color of a rule and specify whether it should appear above or below a block of text; you can also specify the amount of space between the rule and the text it accompanies. Using this anchored-rule feature, you can add graphic impact to subheads and paragraph breaks throughout a manuscript and easily make global changes to any element of the rule.

Oversized capital letters at the beginning of a paragraph — called initial, or drop, caps — are also useful decorative elements. A few programs, such as QuarkXPress and PageMaker's new Drop Cap addition, let you create initial caps automatically by specifying them as part of a paragraph format. You can also make an initial cap by creating it separately, either as a graphic or as a type element, and inserting it into a block of body text as an anchored graphic.

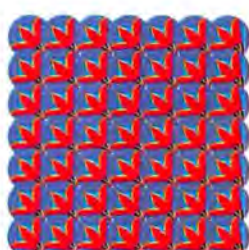
Patterns and Textures

You can import a variety of textures — from fabric to marble to abstract images — into a layout either as scans or as clip art. What you may not know is that you can

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(a)



(b)



(c)

Figure 3: You can create effective background textures with the tools available in most page-layout programs. For an architectural logo (a), I used the line tool to create a black house shape and a grid of blue lines. To add a contrasting fill to the house, I drew an appropriately shaped outline with the polygon tool, filled it with light yellow, and sent it behind the line grid.

Using a program's step-and-repeat abilities, you can quickly create a colorful texture by automatically transforming a single element into a grid of precisely spaced duplicates (b).

You can also create a delicate patterned background, using decorative text characters such as those found in Zapf Dingbats (c). The size and spacing of the characters are easily specified with the standard typographic controls.

create textures with the tools in your page-layout program. All the programs except QuarkXPress come with line and fill patterns that you can use as backgrounds or as textures for geometric shapes. Or you can use straight lines of various colors, widths, and orientations to build up decorative background grids, imitating the look of blue-lined drafting paper, for example (see Figure 3a). The lines can be drawn with a line tool or created with text characters such as hyphens, dashes, or underscores. If you create horizontal lines as text, you can easily control the space between them by adjusting the leading specification.

You can produce other textures from lines and geometric shapes, including rainbow and diagonal patterns and overlapped shapes. DesignStudio, Publish It! Easy, QuarkXPress, and FrameMaker let you group graphic elements, so that complex shapes or entire layouts can be selected and moved as a unit. In other programs, such as PageMaker and Personal Press, you can select and move multiple elements as a group by holding down the Shift key as you click on each item, but the multiple elements will no longer be a group once they're deselected.

The step-and-repeat features available in QuarkXPress, Ready, Set, Go!, and DesignStudio make it easy to create patterns out of multiple copies of a single object (see Figure 3b). You specify the horizontal and vertical offset and the number of copies to make and then sit back and watch as the program automatically creates evenly spaced duplicates. Personal Press has a Replicate command that takes step-and-

repeat a step further by letting you scale copies; its Frame the Page option creates a decorative border by placing duplicates inside the margins all the way around the page.

PageMaker 4.0 doesn't offer a step-and-repeat command per se, but its power-paste option (Command-Option-V) can be used to similar effect. For example, if you draw a square and copy and power-paste it, the copy lands exactly on top of the original. You offset the copy by dragging it to a new position and then power-paste again. The next copy is offset the identical distance from the first copy. Using this technique, you can copy rows of elements and power-paste them into grids (PageMaker 4.2 has a step-and-repeat command). FrameMaker's Align and Distribute commands can be used in a similar fashion to create repeating patterns.

You may have already used oversized characters from symbol fonts such as Zapf Dingbats and Carta as decorative elements. You can also use dingbats and symbols (such as bullets, asterisks, and degree signs) from the standard character set to create patterns composed of many small elements. You can type rows of single or multiple characters and stagger the rows in a grid to create a wallpaperlike design (see Figure 3c). Because the graphics are text characters, you can use typographic controls to alter their size and spacing. A single color can be added to the entire text block or just to individual characters.

Using color is one of the simplest ways to add interest and drama to a page, particularly when you combine it with graphic

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Figure 4: A column of text becomes a graphic element when it's given an interesting shape. For this book cover, we used PageMaker's text-wrap feature to force a text block to follow the outline of a face. I colored some of the type blue and red, which added an eye and mouth to the face silhouette.

elements. All the page-layout programs support spot colors, allowing you to assign a single color to any page element, whether it be text or a graphic. QuarkXPress, PageMaker, DesignStudio, and Ready,Set,Go! support Pantone colors; you choose the desired color by scrolling through an on-screen Pantone color-swatch library. Some programs let you apply color to imported black-and-white and grayscale images. QuarkXPress even lets you tweak the appearance of full-color photographs, and with version 3.1, you can create two-color blends within text and picture boxes.

Text Shapes

All page-layout programs can place text in tried-and-true rectangular columns, and many of them allow you to rotate text. You can also force columns of type into triangular, diagonal, or even wavy shapes — providing another way to add graphic interest to a page. DesignStudio offers 15 preset shapes for text, including circles, triangles, and rhomboids. QuarkXPress' Invert option, part of its text-runaround specifications, lets you place text inside arbitrary shapes. In all cases, although the shapes vary, the text within them remains horizontal.

Other programs don't provide odd-shaped text blocks, but you can achieve almost the same effect by using their text-wrap features to flow text around an invisible object. For example, draw a simple rectangle, make it repel type by applying the appropriate text-wrap specifications, and move the points on the text-wrap bounding box to alter the box's shape. Try creating a zigzag-shaped outline along the right edge of the rectangle. Change the rectangle's line color to white (so it will be invisible on the page), and position it along the left edge of a column of text.

Voilà, the bounding box repels the text column, forcing it into a zigzag shape (see Figure 4).

Importin' Graphics

Convinced that you can create high-quality art without leaving your page-layout program? Great! But if you *do* own a drawing, painting, or image-retouching program or have access to a scanner, a wealth of new material becomes available. Here are some suggestions for enhancing imported art, using the graphics tools in your page-layout program.

Using Scanned Textures. All sorts of textures, from marble to paint splatters, can be scanned into the Mac. With some page-layout programs, such as PageMaker, QuarkXPress, and Personal Press, you can import black-and-white scans and create a two-toned texture by assigning one color to the scan and a second color to the background. The black areas of the image take on the assigned color, and the background color shows through the white areas, which are transparent. The resulting patterns can be used in a variety of ways — as backgrounds for headlines or initial caps, for example (see Figure 5).

Where will you find textures? You can directly scan textured objects such as paper, fabric, carpet, baskets, marble, or wood. You can also rub crayons over a piece of paper placed on a textured object (rough-grained wood or stamped metal, for example) and then scan the rubbing. To create splatter patterns, use a pen or brush to throw ink onto paper. On the electronic side, you can create random stipple patterns by experimenting with the Add Noise filter in Photoshop and certain other painting and retouching programs.

Image Editing. The image-editing functions in most page-layout programs let you transform an ordinary photograph

CIRCLE 12 ON READER SERVICE CARD.



Figure 5: You can easily create two-toned textures in your page-layout program, using an imported black-and-white image as a starting point. Here, I used Photoshop to increase the contrast on a scanned photo of ocean water. The edited scan was saved as a 1-bit TIFF file, imported into PageMaker, assigned a medium-blue color, and placed over a pale-blue background rectangle. The background color shows through the transparent (white) areas of the image, producing the two-color effect. I added black type and a bright-yellow underline to create a decorative initial cap.

into a more interesting graphic. In all programs except Publish It! Easy, you can edit contrast and brightness, posterize an image, or apply a line or dot screen. In some programs, you can add color to grayscale TIFF images to create monotoes or duotoes. Scanned or created 1-bit graphics can be colored brightly and used as foreground elements or be given pale colors and used as background elements (or watermarks) behind headlines or text.

Graduated Fills. Background boxes and other geometric elements become more interesting when colored with a graduated fill. As mentioned, you can use version 3.1 of QuarkXPress to create two-color blends. You can also use a graphics program to create squares, circles, or other shapes filled with graduated colors or grays. These can be imported into your page-layout program to add a touch of class to nameplates, mastheads, and sidebars.

As Alice said in *Wonderland*, "What is the use of a book without pictures or conversations?" You may think your page-layout program can supply only the conversations, but you can also create the pictures. Even the geometric shapes available in every page-layout program can be combined and colored to create strong graphic elements. For inspiration, glance through a book on graphic styles from the 1950s and 1960s, when designers relied heavily on circles, squares, and lines to define space and set off type. Become familiar with your page-layout program's tools, and keep them in mind as you work. You may find you that can meet many of your illustration needs without resorting to a separate graphics program.

Graphic designer Janet Ashford coauthored *The Verbum Book of PostScript Illustration* and is a contributing editor to *Step-by-Step Electronic Design*.

Creating Dynamic Borders in PageMaker

MacUser's art director, Lisa Orsini, frequently uses the graphics tools within PageMaker to create design elements for the magazine's pages. Here's how you'd reproduce the border she created to run around this sidebar:

1. Draw a box with the square-corner tool, and color it red. From the Element menu, choose the Solid fill and None for the line width.
 2. Using the rounded-corner tool, draw another box inside the first one. Choose the Paper fill and square-dot line. Customize the corners of this box, using the Rounded Corners dialog box.
 3. The Zapf Dingbats font has many characters that can be used in borders. To make the yellow triangles along the edges of this border, type a series of s's and select them. Change the font to 12-point Zapf Dingbats, and color the resulting triangles yellow. Set the leading to 12 points.
 4. Paste copies of the triangular pattern into each corner, using the Text Rotation command as needed.
 5. Finally, place a yellow 4-point rule at the top and bottom of the box.
- For more examples of Orsini's PageMaker artwork, see "The MacUser 100," December '91, page 129; "The 6th Annual Editors' Choice Awards," March '91, page 97; and "Buying Smart," January '91, page 174.

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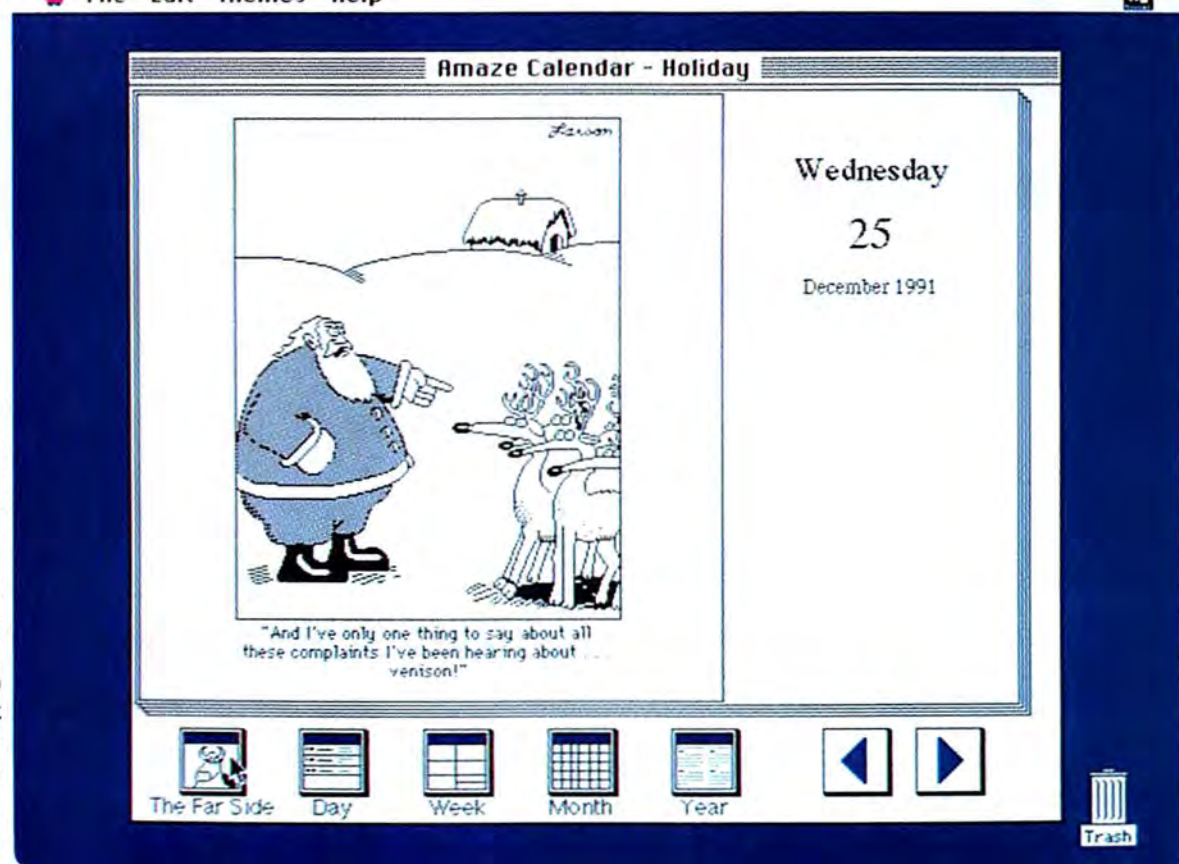
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3-D Blueprints

With a 3-D-rendering program and ready-made parts, you can create convincing architectural models.

By Janet Ashford

An artist's rendering can help you visualize a building project by adding color, texture, and perspective to flat blueprints. Creating the artwork conventionally can be time-consuming and expensive, but a 3-D-modeling program brings speed and flexibility to the rendering process.

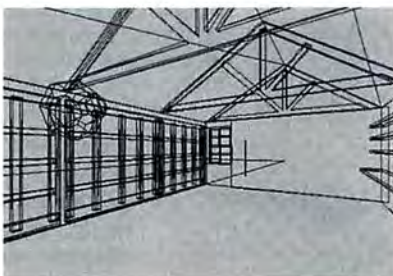
Architect Jim Lennon, of Lennon Associates, Del Mar, California, uses StrataVision 3d to produce strikingly realistic pictures of hospital buildings and interiors. To streamline the process, Lennon has created libraries of surface textures and objects that fit the needs of his practice. Using these ready-made parts, Lennon can create a detailed room model and fill it with furniture and lights in just an hour or two. The model is then rendered (often overnight) to create a color PICT image. Surface textures and other elements can be changed to produce a variety of renderings from the same model.

Many of these modeling features are also available in 3-D programs such as Model-Shop II, DynaPerspective 2.0, and Infini-D, but StrataVision 3d offers the most-extensive libraries of precreated objects and textures.

Graphic designer Janet Ashford coauthored *The Verbum Book of PostScript Illustration*.



Architect Jim Lennon used StrataVision 3d 2.0 to create a client's "dream office" — a spacious, whitewashed room with a high ceiling, a hardwood floor, French doors, and an ocean view. The chairs and tables are based on designs by Breuer, De Stijl, and Le Corbusier. Books, lamps, a vase of flowers, and a Persian rug add warmth and realism, and two of the client's own paintings hang on the wall.



1 Creating the Room Model

Using the client's rough sketch as a guide, Lennon creates the basic room elements: floor, walls, ceiling and trusses, French doors, and shelves. He uses the 2-D-object tools to draw the forms and the Extrude command to make them three-dimensional. A wire-frame view of the model shows the room's simple construction; a light source hangs between the ceiling and the floor.



2 Adding an Environment

To create the ocean view, Lennon applies an ocean texture to a large rectangle placed outside the room and chooses a sky texture for the environment (the imaginary sphere surrounding the model). He then positions the program's camera at one end of the room and renders a quick ray-traced snapshot in draft mode to get an idea of how the space looks.



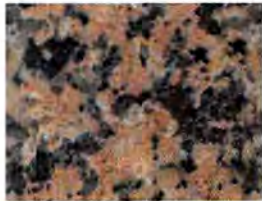
3 Using a Parts Library

To speed up his architectural renderings, Lennon has created a library of items commonly used in offices, which are loaded into room models as needed (each item has a PICT preview for easy reference). Parts can be resized, and their color and surface properties can be altered to fit different interiors.



4 Adding Furniture and Lights

A large black table, several side chairs, a reading chair, a couch, and two lamps are positioned in the model and sized to fit. Each lamp contains a light source that casts shadows as it shines on other elements. Lighting is also provided by sunshine (the angle and color can be specified) and by an invisible floating light source near the ceiling (shown in Figure 1). To preview the model, Lennon renders it with the ray-tracing algorithm; he turns off anti-aliasing to save time. The multiple light sources create a maze of shadows on the floors and walls, adding depth and realism.



5 Using Surface Textures

To add further realism to his renderings, Lennon has developed a library of textures — such as the sky and ocean textures used in Figure 2 — that can be applied to object surfaces, enabling clients to see how a finished project will look. He achieves the textures by scanning photos, by creating artwork in Photoshop, and by using a video camera and a video-capture board to shoot samples of common building materials. His Architectural Textures library contains 167 attributes; shown here are PICT previews for rough wood siding, pink marble, and herringbone brick. This library, and the Furniture Shapes library used in Figure 3, are available through Strata.



6 Creating Realism with Details

The room shown in Figure 4 looks even more realistic with a shiny hardwood floor, which Lennon creates by applying an oak texture and making it reflective. The illusion is enhanced by the addition of details such as books, a potted tree, and a cup and bowl of fruit on the table. The completed model (shown in the opening illustration) includes a Persian rug and two paintings. The rug and the paintings are copies of real items; Lennon creates them by scanning photos and using the scans as textures.

7 Anti-Aliasing the Rough Rendering



(a)

Smoothing the jagged edges in an image, called anti-aliasing, is a time-consuming process. Lennon uses a Mac IIcx with 8 megabytes of RAM and a 19-inch 8-bit color monitor. With this relatively low-powered setup, StrataVision would require 8 to 48 hours to render a complex model at the highest detail with ray



(b)

tracing and anti-aliasing. To save time, the room image is rendered without anti-aliasing (a), which still requires 12 hours. The resulting PICT image is run through JAG (Jaggies Are Gone), an anti-aliasing utility from Ray Dream, which smooths away the image's rough edges in just two minutes (b).

8 Modeling an Entire Project



(a)



(b)



(c)

Lennon produces computer models for most of his hospital projects. To create a night view of a proposed children's hospital, he selects a night-sky environment and turns off all light sources except those within the building (a). An interior view includes a variety of elements and surface textures such as concrete blocks and glass bricks (b). Photoshop is often used to touch up and add details to the renderings. A proposed hospital corridor is rendered in StrataVision and then opened in Photoshop, where a scanned photo of a doctor is added (c). Various selection tools and semitransparent gray paint are used to add shadows beneath the figure.

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By Henry Bortman

Dialing in: For PowerBook users anxious to take advantage of AppleTalk Remote Access, Global Village will offer two products: the TelePort/LapFax (\$399), an internal 9,600/2,400-bps send/receive-fax modem, and the TelePort/Lap V.32 (\$899), a 9,600-bps internal modem (no fax) with a very small, very cute external telephone-interface module. Both modems feature V.42 error correction and V.42bis data compression. (415) 329-0700. ♦ For those who click and drive, Microcom's MicroPorte 1042 (\$649) external portable modem uses V.42bis and MNP 10 error correction to ensure error-free data transmission in cellular environments. (617) 551-1007. ♦ Shiva, maker of dial-in products for AppleTalk networks, plans to support the AppleTalk Remote Access protocol in its future products and may support it in the NetModem/E and other currently shipping products. (800) 458-3550 or (617) 252-6500.



Pens: PI Systems recently announced Infolio, a proprietary pen-based computer and operating system for custom applications. Infolio has a 68331 microprocessor, a 15-hour battery life, and weighs less than three pounds, and costs less than \$2,000. A docking unit lets you connect to Macs, PCs, or other hosts. (503) 293-9585. ♦ And at the higher end, Slate's PenBook software will translate Mac or PC "print to disk" PostScript files into compressed bit-mapped files that can be read on a PenPoint-based computer. You can't edit the contents, but you can scribble notes in PenPoint's "ink" layer. (415) 345-5100.

Crossing platforms: Silicon Graphics' IRIS Graphics Library, a set of high-performance interactive 3-D-graphics routines, is now available for general licensing. Compaq, DEC, Intel, and Microsoft have all endorsed it. ♦ And SunSoft, the software spin-off of Sun Microsystems, is porting its Solaris distributed multitasking operating system — formerly available only on SPARC-based workstations — to Intel 80x86-based systems. Dell, AST, Toshiba, CompuAdd, NetFRAME, and Novell are interested.

Silicon storage: Why didn't Apple make the ability to use RAM cards available as an option for its PowerBooks? After all, IBM did for its new PC Radio, a DOS portable with built-in modem (the high-end model will sport a cellular modem) and optional built-in thermal printer. Due in 1992; no pricing was available at press time. ♦ RAM-card technology not up to snuff, you say? Apple is checking out SunDisk's low-power 10-mega-byte SD-IDE flash-EEPROM storage system, whose built-in controller emulates a hard-disk drive. The memory card is as big as a credit card; a pair of them, properly harnessed, fit in the same space as a 2.5-inch drive. (408) 562-0500. ☞





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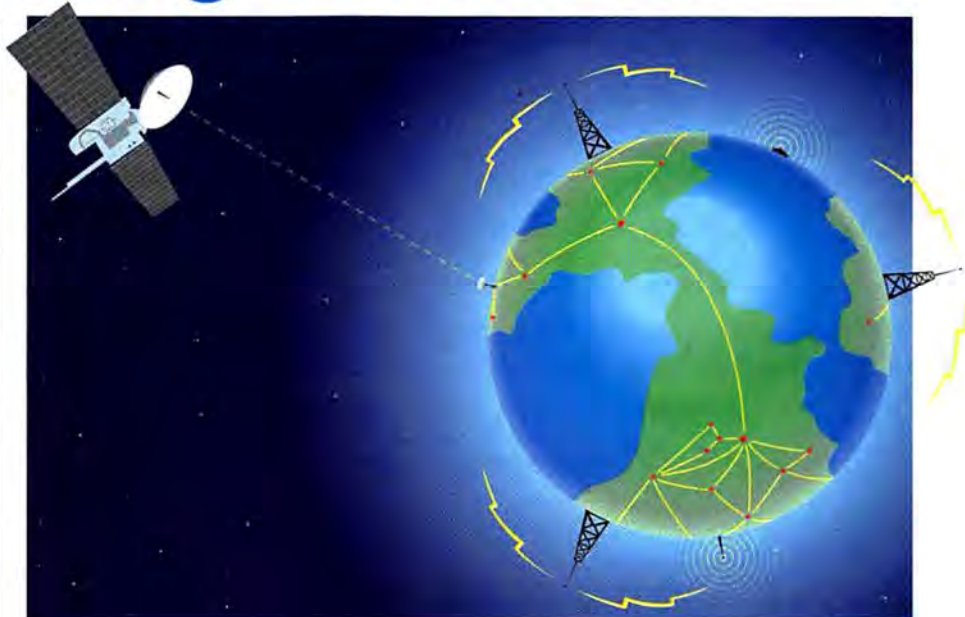
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Networking the World

Just because you've expanded your business to another location doesn't mean that you have to give up your network — a wide-area network can connect all your sites at a surprisingly low cost.

By Paul Deas



Macs are known for their plug-and-play networking capabilities. With the addition of some connectors and cables, all the Macs at a single location can become part of a LAN (local-area network). Although the first LANs were mainly used to share laser printers, they now routinely incorporate E-mail as well as shared modems, printers, and file servers. For any organization that needs to share data quickly and easily, a LAN is vital, and when your organization expands beyond a single location, perhaps to another city, you don't have to sever this lifeline — you can connect geographically separate LANs to create a single integrated WAN (wide-area network).

With a WAN, the capabilities of AppleTalk networks are expanded to every Mac in all locations. For example, a worker in San Francisco can print a document on a laser printer at the company's Los Angeles office. File servers can be accessed from multiple locations to provide centralized data storage. The beauty of Mac networking is that all these capabilities are automatically available to each Mac and are transparent to users. Although there may be a degradation in speed, the standard Chooser is still used to select a printer or mount an AppleShare volume, whether it's in Los Angeles or Columbus, Ohio. This article looks at low-cost, permanent WANs suitable for small businesses.

The Expanding LAN

To understand how a WAN is created, you first need to know what happens when a LAN expands. As a LAN grows, it may become necessary to split the network into two or more segments linked by devices called *routers*. Once two or more networks have been linked, the result is called an *internet*, and the key to its operation lies in the routers that provide the paths among networks.

A router contains extensive information about the location and, more importantly, the possible paths that can be used to reach each device. This means that a router can choose the best path between two devices and send the data on its way. A router separates the network into two distinct zones or subgroups of Macs.

The only change users are likely to see when an internet is created is an addition to the Chooser dialog box — the left-hand window automatically splits into two windows, with the bottom one showing the zones that make up the network. To select a Chooser device on an internet, users first select a zone and then select printers, file servers, and other network devices as usual.

Creating a WAN is similar to adding another zone to your internet, except that you use a remote — rather than a local — router. Whereas a local router is a single device that links two networks directly, a remote router consists of two half routers connected by a

telephone line. Remote routers are specifically designed to take advantage of telephone services provided by local and long-distance phone companies.

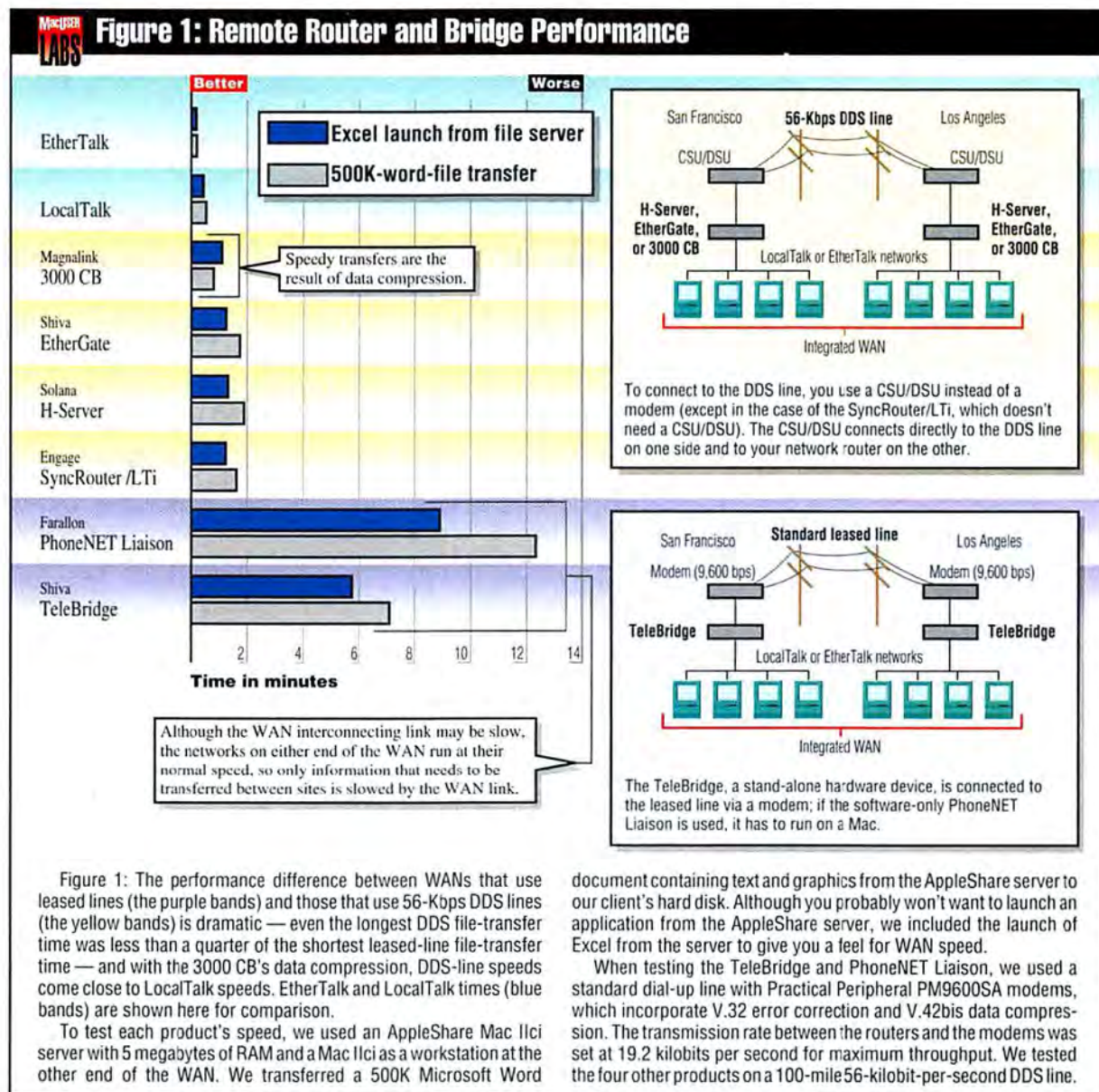
One of the problems of using routers to create a WAN is that they generate a lot of unnecessary — and potentially expensive — network traffic. Every ten seconds, routers send messages across the network to check that the information they have about the internet is correct. A new protocol from Apple, the AURP (AppleTalk Update-based Router Protocol), should take care of this problem by letting routers update only when a change occurs, thus

cutting back on unnecessary network traffic. At press time, several router vendors had announced that they would include the AURP standard in future products.

Although you can create part-time WANs that can be activated on demand (for example, a remote E-mail connection), in this article, we'll look at Mac-specific options for creating a permanent and low-cost WAN connection that is available 24 hours a day. (For a unique way for individual users to connect remotely to a central AppleTalk network, see "AppleTalk Remote Access," December '91, page 203.)

The Phone Link

The type of telephone service between your sites dictates how fast data can be transferred. At the low end are standard leased telephone lines. These dedicated circuits are similar to voice lines except that they are specifically for data transmissions. The installation charge for a leased data line is similar to that of any business leased line (\$600 to \$800), and the monthly charges are based on the distance between your sites. In Northern California, for example, the base charge per month is \$60 and there is a surcharge of \$5 per mile. As the distance increases,



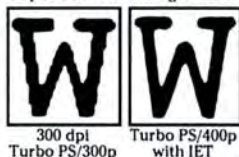
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the per-mile charge goes down — a leased line between San Francisco and New York costs 34 cents per mile.

Another available telephone circuit provides a dedicated line capable of whizzing data along at 56 kilobits per second. It's variously known as DDS (Digital Data Service), ADN (Advanced Digital Network), and ASDN (Accunet Spectrum of Digital Services). Your phone company may give it another name, but what counts is the speed of 56 kilobits per second. We'll refer to this type of line as DDS. A similar service to DDS is ISDN (Integrated Services Digital Network). Although ISDN is widespread in some European countries, it has yet to become widely available in the U.S.

A DDS circuit's installation cost can run as high as \$1,000 to \$2,000. As with a leased line, the monthly charges for DDS vary according to distance: In Northern California, for example, the base cost is fixed at \$100 per month, regardless of the distance, plus a surcharge of \$6 per mile. Again, as the length of your DDS line increases, the per-mile charge goes down — as with a leased line, a DDS line from San Francisco to New York costs 34 cents per mile.

If you need faster transmission than DDS allows, you'll need a T1 circuit, which can transmit at speeds as great as 1.54 megabits per second. The bad news is that you pay a premium for both the interface equipment and the circuit. The monthly charges for an 80-mile T1 are approximately \$1,800 per month.

What Is a WAN?

You need three components to create a WAN. The first is a telephone-company communication line between your sites. If you'll only be sending E-mail and occasionally transferring files, the less expensive leased data line may be perfect for you. On the other hand, if you'll be accessing file servers and transferring a lot of documents, you'll need the better performance of a DDS line.

Once you have the circuit, you need a communication box that connects you to the telephone company's wall jack. The hardware choice is tightly linked to the type of telephone service you've chosen. For the leased-line options, you use standard modems. For a DDS circuit, you need a CSU/DSU (Channel Service Unit/Data Service Unit). In both cases, the box provides an interface from your AppleTalk

Table 1: What's Your Line?



	 Pros	 Cons
Data-grade line	<ul style="list-style-type: none"> •Inexpensive way to get a wide-area network for light use. 	<ul style="list-style-type: none"> •Slow.
DDS line	<ul style="list-style-type: none"> •As much as four times as fast as a leased line but still slower (and less expensive) than the high-speed T1 option. •Costs will soon be comparable with those of a leased line. •Products with compression offer speeds close to those of LocalTalk. 	<ul style="list-style-type: none"> •Currently more expensive than a data-grade line.

Table 1: The WAN solutions outlined in this article work best for small companies with limited resources and light communications needs. Here's a quick rundown on who would benefit most

router to the phone company's wires.

Last, you need a WAN router. This is either software or hardware that links your geographically separate LANs to create a single WAN. Once again, what you choose depends on the telephone-company circuit you've chosen. Each manufacturer supplies network-management software for its WAN router. This software lets you set passwords and configure the router, and in some cases, it provides you with information for evaluating the state of your WAN link.

Quick and Easy

A dedicated data-grade line provided by a telephone company is similar to a dial-up line, except that it's connected all the time, has a low error rate, and is less noisy. The interface equipment is a standard modem, and it pays to get the fastest available. Because most high-speed modems use adaptive data compression, the effective throughput can be as great as 38,400 bps — fast for modem communications but slow compared with networking speeds (even LocalTalk runs at 230 kilobits per second, whereas Ethernet speeds along at 10 megabits per second). The results we achieved during our tests

were not even close to the theoretical 38,400 bps.

To complete your WAN, you need a router. The Shiva TeleBridge and Farallon's PhoneNET Liaison are two of the most commonly used low-speed WAN routers. Each of these products takes information from an AppleTalk network and transmits it to a remote network, using modems.

The TeleBridge is a stand-alone hardware device that sits between a modem and a LocalTalk network (see Figure 1). A control panel (Shiva Config) lets you establish the connection between the remote networks from any Mac on the network. The InterNet Manager software lets you configure various options on the TeleBridge, such as dial-in and dial-out passwords, but, unfortunately, provides only limited statistical information on the WAN link (see Table 2 for features of PhoneNET Liaison and the TeleBridge).

Farallon's PhoneNET Liaison, on the other hand, is a software-only solution that can run in the background on any Mac. A modem plugs in to the Mac, and Liaison provides the necessary logic to route packets to the remote network. You might consider this solution if you already have



Ideal Users

- Because such a line is slow, this type of service is best used by a branch or satellite office of a large company. Best tasks for a leased line include E-mail and copying files from a central server.

- A DDS circuit is best used by a small company (say, about 10 Macs) that needs access to a central server. Because of the greater speed, users can perform such tasks as accessing accounting systems and sharing workgroup documents. Having too many users can seriously affect throughput times.



Costs

- Installation: \$600 to \$800.
- Base charge: \$60 per month.
- Per-mile charge: \$5 (costs decrease as distances increase).

- Installation: \$1,000 to \$2,000.
- Base charge: about \$100.
- Per-mile charge: \$6 (costs decrease as distances increase).

from each type of product described as well as how much you may end up spending. All prices are approximate and are based on costs for setting up an 80-mile WAN in Northern California.

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a dedicated AppleShare server or if you have local as well as remote routers.

If you don't have a dedicated file server, the Mac that PhoneNET Liaison runs on must be turned on day and night to make your WAN constantly available. If the Mac crashes, so will the WAN connection. Unless you have an AppleShare server, you may want to stick with the TeleBridge, because it isn't susceptible to these problems.

In our tests (see Figure 1), the TeleBridge outperformed Liaison hands-down. To transfer a 500K Microsoft Word document from the AppleShare server to a Mac IIci 80 miles away, Liaison took 12 minutes whereas the TeleBridge took only 7 minutes. (In comparison, transferring the file to a Mac on the same LocalTalk network took only 32 seconds).

Obviously, this type of connection, although low-cost, is too slow to be used for much else besides E-mail and occasional file transfers. If you want to do large-volume transfers or real-time interactions with a file server, you'll have to take the next step — to a DDS line.

The DDS Option

A DDS line provided by your local or long-distance phone company is very different from a standard telephone line. Whereas most low-speed communication is asynchronous, DDS data transfers are synchronized to a telephone-company clock. Instead of using a modem, you use a CSU/DSU to connect to a DDS line. These units connect directly to the DDS circuit on one side and to your network router on the other (see Figure 1).

Installation of a DDS circuit is more complex than that of a leased line. After the wire has been installed, two or three telephone-company technicians must test your line to ensure that it meets the bit-error requirements, so expect a fairly hefty installation charge. Once you've installed the DDS circuit, however, connecting a CSU/DSU is simply a matter of plugging in a standard RJ-11 phone cable.

A CSU/DSU is usually connected to your router via a square V.35 connector, which is the standard interface for high-speed communications devices. Some CSU/DSU manufacturers, however, also offer RS-232 and RS-449 interfaces. Before you buy a CSU/DSU, make sure its interface matches that of your remote router.

In order to talk to the CSU/DSU, WAN routers must be capable of supporting

synchronous communications. Engage Communication, Solana Electronics, and Shiva all have products that have been specifically designed to communicate over DDS circuits, although Shiva does a poor job of documenting the remote features of its DDS router, the EtherGate (see Table 3 for features of these products).

Of these companies, Engage has the broadest range of products (the SyncRouter LT, LTz, and LTi). The SyncRouter LT provides all three types of CSU/DSU interfaces (RS-232, RS-449, and V.35), giving users a lot of choice for a CSU/DSU. The LTz is similar to the LT but adds zone cloaking — the ability to permit selective screening of zones for added security. The LTi takes the process one step further by eliminating the need for an external CSU/DSU completely. This is the Engage router we used in our speed tests. The LTi uses a phone cable to connect to the DDS jack, and a LocalTalk connector provides the link to your network; installation takes less than five minutes. Regardless of which SyncRouter you use, once you've turned it on, the WAN link is automatically established. If the link goes down for any reason, the SyncRouter continuously attempts to re-establish communications.

The SyncRouter comes with SyncView management software, which monitors SyncRouter activity and sets some configuration options. The SyncRouter is compatible with Phase 1 and Phase 2 AppleTalk networks and is a full-function router. Our only complaint concerns its use of the old nine-pin LocalTalk connector from Mac Plus days. Engage says that this provides a better connection than the newer eight-pin DIN socket, but you might have to do some searching to find the correct connector.

Solana's H-Server is considerably more difficult to get running than is the SyncRouter. Although the documentation and configuration software lets you specify Phase 1 or Phase 2 AppleTalk, at press time, the H-Server did not support Phase 2 (this may have changed by the time you read this). In addition, you have to make sure that the H-Server is not close to a terminator — Solana recommends that you place it somewhere away from termination, or the H-Server may not appear on the network.

In order to test the H-Server, we had to shift to Phase 1 AppleTalk from Phase 2 and remove our LocalTalk termination. Under these conditions, the H-Server

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established and maintained the WAN connection automatically. We were able to run the performance tests, but the H-Server Manager software occasionally crashed and showed erroneous configuration data.

The third product we looked at, Shiva's EtherGate, uses the same InterNet Manager software as the TeleBridge to configure and establish connections. Unfortunately, Shiva has no documentation on synchronous-mode operation — not even

a cable diagram accompanies the user manual. You have to call Shiva's tech support to find out how to connect your EtherGate to the CSU/DSU. Also, you have to establish the WAN connection manually, using the EtherGate's control-panel software. It doesn't automatically create a connection or reestablish it after a link failure.

If you compare the results in Figure 1, you'll see that DDS links are significantly faster than those of the leased-line products. Even the longest DDS file-transfer time was less than a quarter that of the Shiva TeleBridge. The SyncRouter/LTi consistently showed the best performance, with a transfer time of 1 minute, 37 seconds for the 500K Word document. Although Solana's H-Server was slower than the other products, it was only 5 seconds behind the SyncRouter/LTi in the Excel-launch test.

LocalTalk Speeds with DDS?

If you think DDS isn't fast enough and you're using Ethernet on your LANs, take a look at the 3000 CB data-compression bridge, from Magnalink (formerly Cryptall). This bridge gives you the best of both worlds — 56-kilobit-per-second DDS communication and a dynamite compression algorithm. The manufacturer claims an average compression ratio of 4:1, which yields an effective throughput of 224 kilobits per second. This bridge can come close to LocalTalk's 230-kilobit-per-second rate (see Figure 1).

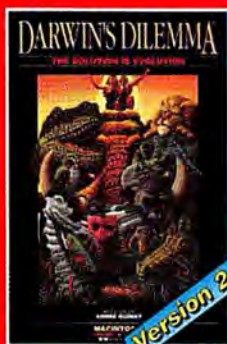
Because the 3000 CB is a generic Ethernet bridge, it performs none of the routing functions of AppleTalk routers. It learns where devices are and forwards packets over the WAN from one Ethernet network to the other. Users have little indication that the 3000 CB exists on the network — all they see is an extension of a single zone, not an additional internet zone. The drawback of this scheme is that a large network can generate more WAN traffic than is necessary.

The 3000 CB is packaged in a standard 19-inch rack-mounted box. An RS-232C communication port on the back of the unit lets you access the internal diagnostics software; you can connect this port to any dumb terminal or to a Mac running telecom software. The 3000 CB is a network manager's dream, because it compiles extensive WAN and LAN statistics.

In our performance tests, the 3000 CB was more than twice as fast as the SyncRouter in the 500K file-transfer test,

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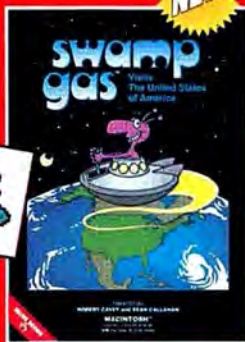


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taking only 48 seconds. Its results in the Excel-launch test were much closer to those of the other products, because binary files don't compress as well as Word documents do.

Using the 3000 CB in everyday applications provides a better picture of what compression does for performance. Any AppleTalk network contains a certain amount of "background" traffic. If you have a Mac turned on, it generates some of this background traffic, and when you add printers, E-mail servers, routers, and AppleShare, the background traffic increases. During our tests, we routinely had compression ratios as high as 9:1 for background traffic; after a day of normal use, the 3000 CB reported an overall compression ratio of 3.5:1.

All this comes at a price. Each bridge costs a whopping \$7,900 and provides only an EtherTalk interface. It's a good solution if you already have Ethernet or plan to put your Macs on Ethernet. However, the up-front cost looks a little more reasonable when compared with the additional monthly costs of going to a higher-speed telephone service such as T1. For those who need better than DDS speed and don't want to drastically increase their monthly phone charges, the 3000 CB is the best alternative we tested.

High Speed, High Cost

For even greater speeds, you need to take a large step to either a T1 circuit (24 DDS-type channels) or a fractional T1 (a subset of the 24 channels). The total bandwidth of a full T1 circuit is 1.54 megabits per second. If you don't need that much bandwidth, you can use some of the channels for voice and/or data and use whatever is left over to link your LANs. This flexibility makes it the circuit of choice for large companies.

The good news is that there are many products for bridging AppleTalk LANs that can use either an entire T1 circuit or a fraction of one. You'll probably want to have Ethernet feeding the bridge, because it doesn't make much sense to provide a 1.54-megabit-per-second WAN connection for a 230-kilobit-per-second LocalTalk network.

The bad news is that these products are expensive and that you're probably going to need the help of a data-communications firm to ferret out your options. It isn't unusual for the communications equipment in a T1 system to cost a lot more than \$30,000.

The Bottom Line

For those on a tight budget who need a low-traffic WAN connection, the Shiva TeleBridge is a solid performer. Its performance was so superior in our tests that unless you already have PhoneNET

Liaison as a local router, we recommend that you use the TeleBridge.

If you need real-time access to a file server or have many users on-line, seriously consider one of the DDS options. The Engage SyncRouter/LTi is a good

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choice, because of its easy installation and automatic operation.

If you need both a LocalTalk/EtherTalk router and a WAN, consider the Shiva EtherGate, because it can provide both of these functions simultaneously. With options such as these, there's no point in trying to work around the Solana H-Server's problems.



If you need the speed and can absorb the one-time cost of the units, Magnalink's 3000 CB is the cream of the crop. Its adaptive data compression coupled with its comprehensive diagnostics make it an excellent product. It can also grow with you and easily migrate to a full 2.048 megabits per second if you need increased speed in the future. The performance

benefits of compression will push the other manufacturers to include compression in their products.

If you can't justify the cost of a DDS, don't forgo a WAN connection completely. A leased-line WAN can still provide a crucial information link — just having shared E-mail can sometimes justify the connection. In addition, in the near future, the price difference between a leased line and DDS will become minimal. Besides, even a "slow" 12-minute file transfer beats the U.S. Postal Service when you're faced with a deadline.

Paul Deas is president of Serra Systems, a software-development company based in Healdsburg, California.

Table 2: Features of Low-Speed WAN Routers

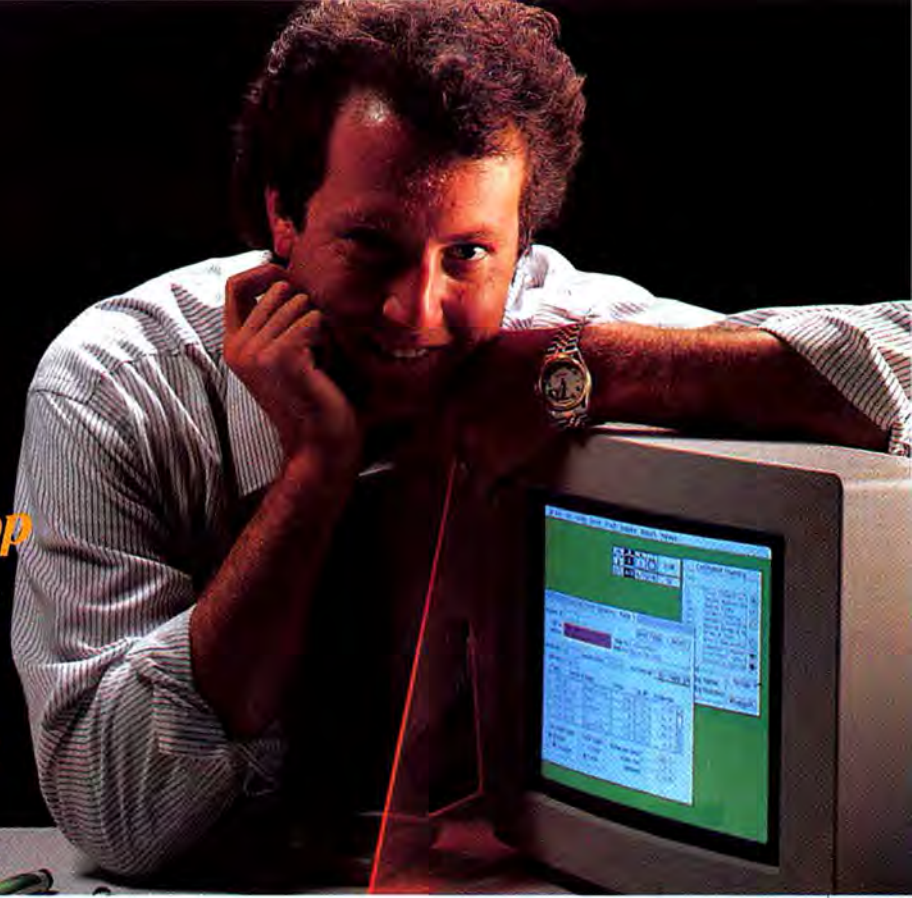
		
	Farallon PhoneNET Liaison	Shiva TeleBridge
	***	****
List price	\$395	\$599
Pros	Low-cost software router. Can double as a local router.	Low-cost router. Faster than PhoneNET Liaison.
Cons	Speed limited by modems used. Slow.	Speed limited by modems used.
Features		
Synchronous link	NA	NA
Asynchronous link	dial-up or leased voice line	dial-up or leased voice line
Interfaces	RS-232	RS-232
Maximum speed	57.6 Kbps*	57.6 Kbps*
Automatic connect	●	○
Automatic reconnect	○	○
Secondary dial-up	NA	NA
Data compression	in modem	in modem
EtherTalk interface	●†	○
LocalTalk interface	●	●
Phase 2-compatible	●	●
Security	●	●
Data encryption	○	○
Utility software	Liaison	InterNet Manager
Software type	Chooser	application, control panel
Company	Farallon Computing, Inc. 2000 Powell St., Ste. 600 Emeryville, CA 94608 (510) 596-9000	Shiva Corp. One Cambridge Center Cambridge, MA 02142 (800) 458-3550 (617) 252-6300

* Actual speed limited to modem speed.

† EtherTalk card required.

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But I'm the boss and the buck stops with me. We had bills to pay, payroll checks to write, invoices to send, taxes to set aside.

And deadbeats to collect from—only I had no idea who owed us how much or for how long. Some suppliers may have even

thought of us as deadbeats. I needed to know our cash flow, and get a handle on all this. But I didn't have a lot of time.

Step one: find an accounting program that feels as familiar as our Macs, that starts out easy, but has lots of reserve firepower for later on.

I found atOnce! The manual looked orderly. I dug in...

The familiar with the unfamiliar

atOnce! starts you off with a tutorial that uses HyperCard, one of my old favorites. I was at home.

Numbers are my nemesis, but the tutorial was actually fun and got me comfortable. It takes you step by step through the program, and gives you some easy-to-swallow accounting basics so you're not reading a foreign language. There's context-sensitive help, just in case.

And while you learn, you can start to set up your books. So it doesn't come in a flash and you sweat a little. But you do it and you learn.

I started off light. Double-clicked on one of the default charts of accounts and my General Ledger was practically set up for me. Then entered a few client names in Accounts Receivable, to get an idea of what was coming in. Prepared six invoices—and atOnce! calculated sales tax. Nice. Printed the invoices which I redesigned in atOnce!—realign a field here, change a font there. The usual.

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Table 3: Features of DDS-Compatible Bridges and Routers

				
● = yes ○ = no	Engage SyncRouter/LTi \$\$\$%	Magnalink 3000 CB \$\$\$	Shiva EtherGate \$\$\$%	Solana H-Server \$%
List price	\$2,495	\$7,900	\$1,899	\$2,195
Pros	Simple to use. Fast.	Comprehensive diagnostics. Excellent data compression. Fast.	Ethernet interface. Can double as a local router.	Good security.
Cons	Limited statistics. No automatic backup link.	Expensive. No LocalTalk interface.	Incomplete RS-232 interface. No instructions or cable diagrams for synchronous mode. No automatic backup link.	Not yet Phase 2-compatible. LocalTalk termination sensitive. No automatic backup link.
Features				
Bridge or router	router	bridge	router	router
Synchronous link	DDS, ISDN, T1	DDS, ISDN, T1	DDS, ISDN, T1	DDS, ISDN, T1
Asynchronous link	dial-up	dial-up	dial-up	dial-up
Interfaces	RS-232, RS-449, V.35	RS-232C, RS-449, V.35	RS-232*	RS-232, V.35
Maximum speed	500 Kbps	2.048 Mbps	64 Kbps	64 Kbps
Automatic connect	●	●	○	●
Automatic reconnect	●	●	○	●
Secondary dial-up	manual	automatic	manual	manual
Data compression	○	●	○	○
EtherTalk interface	none	thick, thin	thick, thin	none
LocalTalk interface	●	○	●	●
Phase 2-compatible	●	●	●	○
Security	●	●	●	●
Encryption	○	●	○	○
Utility software	SyncView, SyncDialer	built-in	InterNet Manager	H-Server Manager
Software type	application	communications program	application, control panel	application, Chooser
Company	Engage Communication, Inc. 9053 Soquel Dr., Ste. 201 Aptos, CA 95003 (408) 688-1021	Magnalink Communications 63 Nahatan St. Norwood, MA 02062 (617) 255-9400	Shiva Corp. One Cambridge Center Cambridge, MA 02142 (800) 458-3550 (617) 252-6300	Solana Electronics 4907 Morena Blvd. Ste. 1404 San Diego, CA 92117 (619) 490-5050

*The EtherGate's nonstandard RS-232 port has only a single clock input in synchronous mode.

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NEW



19" SuperMac Color Display (SuperMac)

SuperMac's most affordable display for professionals who demand full-page resolution, impeccable color realism, and outstanding imagery. Its 1024 x 768 WYSIWYG resolution ensures that text and graphics appear the same on-screen as in print. And for color realism, SuperMac uses phosphors with an extended color range and tunes the display to a natural white point. Spectrum/8.24™ delivers 8-bit accelerated graphics on large-screen displays and 24-bit accelerated graphics for small-screen displays. Spectrum/8.24™ family provides 8-bit color for NuBus Macintosh systems. Spectrum/8.24 PDQ DR10437 \$999. See line listing for further pricing. SuperMac Color Display MON0224

\$1799



FileGuard 2.7



It's sleek, fast, and safe. I highly recommend it. - MacUser April '91. FileGuard protects your hard disks, applications, files, and folders (including System folder) from unauthorized access, copying, and deletion. Includes screen locking and audit trail capability. Also available in 5 or 10-user packs. UT10135

\$139



ScreenShot (Baseline Publishing)

ScreenShot 1.2 (Baseline Publishing) Easily capture your screen images. Hit the user-definable key combination and this handy CDEV pops up a menu to specify whether you want to print or save it in one of several formats. Captures whole screens, windows, menus, or selected portions. UT10183 \$34. Talking Moose and His Cartoon Carnival 4.0 uses charming, random messages to relieve the tedium of working long hours on your Mac. ENT0403 \$23. Thunder 7 1.0.4 checks spelling in any document. Save disk space and enjoy the convenience of teaching just one spelling checker new words only once. SPL0029

\$56



Powerkey with Quickeys Lite Powerkey Remote

Turns on your Macintosh and peripherals from the keyboard. Can be programmed with an on/off schedule, and four outlets provide power line protection. Remote option lets you turn on your system with a single phone call. Works with all ADB-equipped Macs. Powerkey includes Quickeys Lite at no additional charge. PowerKey ACC0535 \$64. PowerKey Remote ACC0619

\$35



WristSaver/ Wrist MousePad (LB Innovators)

The WristSaver cradles your wrist with a contoured neoprene rubber pad and a nylon covering. It's ergonomically designed to support your wrist at the proper angle to help avoid the pain associated with Carpal Tunnel Syndrome. The WristSaver MousePad provides a comfortable rest for your wrist, plus a conventional mouse pad. Simple finger movements replace sliding the entire arm or hand. WristSaverMousePad ACC0634 \$18. WristSaver ACC0550 \$18. Bundle BND0031 (Available in Gray, Black, Red or Navy)

\$29



The PowerBundle (T/Maker)

The PowerBundle includes T/Maker's popular word processor, WriteNow, and their ClickArt for Fax and Field. Together, these will take care of your communications needs in style. The PowerUp AddressBookPlus 2.0 will give you instantaneous access to names and addresses. Business Expense Reports from Chipsoft automates the job of tracking travel expenses. America Online keeps you in touch with the world. Since the PowerBooks don't come with a carry case, the PowerBundle includes an elegant black cordura padded case with pockets for all your software and accessories. BUS0193

\$159



ProModem 2496 S/R Minifax Plus

Complete data/fax solution in a mini-size. Get up to 9600 bps throughput on this 2400 bps data modem with V.42bis/MNP-5 data compression and error correction. Plus you get 9600 bps send/receive fax, all the software, and cable. MOD0076

\$279



PICTURE IT!/Vocabulearn/ce (Penton Overseas)

Penton Overseas has developed a stimulating way to break the global language barrier... PICTURE IT! offers a highly interactive "bilingual" approach to a foreign language dictionary...complete with more than 500 high resolution graphics, native pronunciation, and expandable resource file. Create your own custom electronic dictionary, with sound, pictures and text...A must in any language learning environment! EDU0292 \$42. Full line available. Vocabulearn/ce is now available in Level III, and Compact Disc to help expand your vocabulary base with thousands of new words and phrases! Vocabulearn/ce \$35. ea. Compact Disc \$69. ea. Full line available.

\$42

FREE

POWER USERS TOOL KIT 7.0

If you're not already a collector of Steven Bobker's highly successful Power User's Tool Kit - compiled exclusively for MacWAREHOUSE - you'll want to start with version 7.0. It's stuffed with ten useful applications, utilities, desk accessories INTs and System 7.0 extensions for your Macintosh. They're great productivity enhancers and you'll be surprised how easy they are to use.

Steven Bobker Presents

THE POWER USERS TOOL KIT 7.0

ALL NEW!

- Save-a-Tree - print out text-only files with four reduced pages on the front side of one!
- LaunchINT 2.0s - logs the activity of your Mac - vital if you take a computer tax deduction.
- Applicon - System 7.0 users can switch among open applications by clicking on tiles on your desktop.
- Plus much, much more.

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All New!

Includes: • Save-a-Tree - so you can print out text-only files with four reduced pages on the front side of one! • LaunchINT 2.0s - logs the activity of your Mac - vital if you take a computer tax deduction. • Applicon - System 7.0 users can switch among open applications by clicking on tiles on your desktop. Plus much, much more.

And the best thing is,

the programs are shareware so you can try them FREE when you order from MacWAREHOUSE. You pay only \$1.50 shipping and handling if you want the disk. If you wish to continue using the software, some authors ask that you pay a small fee (\$5-\$25). All the details are explained on the disk, which is yours to keep. Please remember to ask for item # AAA 0013 when you order.



Hayes Personal Modem 2400 Plus with Smartcom (Hayes)

The Hayes Personal Modem 2400 Plus provides you with everything you need to go on-line. This 2400 baud modem has a built-in call-monitoring speaker and two LEDs, plus both phone computer cables. Included in the package is the Smartcom terminal software to make using your modem simple and convenient. It fully supports the Mac interface. Also emulates popular terminals, such as TTY and VT52/102, to make mainframe and mini access easy. File transfer protocols include XModem and MacBinary. Smartcom even allows you to automate log-ons. MOD0060

\$149



Blueprint 2.1

• Blueprint makes 2D drafting and design easy. It has a hierarchical symbol library, automatic alignment, auto-dimensioning, and witness lines. It calculates with 9-decimal precision, so you can work at any

convenient scale. Blueprint offers unlimited layers, color, hatching, mirroring, and a built-in DXF translator. Blueprint also exports EPS files. CAD0024

\$219



M. Y. O. B. 2.1

• M.Y.O.B. 2.1 is an INCREDIBLE ACCOUNTING SOFTWARE system for small to medium size businesses. Features include fully integrated general ledger, A/P, A/R, inventory, checkbook and card-file. Gives you features not found in accounting packages costing hundreds of dollars. Great Value! FIN0087

\$139

Teleport, the ADB Modem (Global Village Communication)

• This 2400 baud modem with MNP5 data compression packs Hayes compatibility and error-free communication. TelePort plugs into your mouse (ADB) port and provides a pass-through connector for other devices. Uses no external power supply, and leaves your serial port free for other uses! MOD0049 \$139. TelePortFAX includes SendFAX 9600 baud modem software. MOD0058



\$185

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Accountant Inc. (Softsync/Bloc)

Accountant Inc. is the most complete integrated accounting and financial management package for the Mac" says MacUser Magazine 3/91. Starting up with Accountant Inc. is quick and easy. Combines exceptional power with an elegant user interface to provide more flexibility and better reporting with less work. Unlike other packages, Accountant Inc. will grow as your business grows. Package includes Invoicing, Inventory, Receivables, Payables, Check Writing, Job Cost, Payroll, Integrated General Ledger and Financial Reporting.
FIN0048

\$339



More After Dark (Berkeley Systems)

It's M.A.D.! It's More After Dark—Over 25 incredible new displays for After Dark, the Ultimate Screen Saver. Features contest winners Mowin' Man, Tunnel, GraphStat, and many beautiful new fish! Kittens, Art Museum, and Lunatic Fringe game module help save your screen from phosphor burn-in. (Requires After Dark software.)
UT10230 \$25.

After Dark 2.0

After Dark 2.0 displays over 35 screen savers including classics Flying Toasters and Fish! Includes sound, password protection, logo and message display.
UT10119 \$29. Buy both and save UT10231

\$45

First Things First

Simplifies the process of keeping track of your appointments. Place its floating, always-on-top DeskClock Button anywhere on screen and your schedule is always just a double-click away. Lets you put calendar items into up to 20 categories. Display windows tell you what you need to know at a glance. Special Offer: Free copy of LifeGuard included.
BUS0190



\$49



Hand-Off II Ver. 2.2.1 (Connectix) ★★★★★

Get HAND-Off II for fast, easy file access. SuperMenu™ for System 7 makes the Apple menu multi-level. Instantly open or browse an unlimited number of files, folders, applications or aliases hierarchically. •Pop-up menu speeds opening files and applications with "Briefcases™" which create custom groups of applications and/or documents. •On-the-fly application substitution eliminates the "Application Not Found" error message. •Switches application color depth and sound level automatically. •AutoHide™ reduces Desktop clutter by automatically hiding background applications.
UT10148

\$56



MAXIMA 2.0

4MB SIMM users! MAXIMA 2.0 extends your RAM access to as much as 128MB. Creates a powerful non-volatile RAM disk that survives crashes, Restarts, and Shutdowns. Get MAXIMA 2.0 to maximize your RAM investment for System 6 or 7 in 24-or-32-bit mode. UT10209

\$45



MacBible King James Version

Revolutionize the way you study the Scriptures. Includes a flexible word-and-phrase search mode, a verse mode for displaying any range of verses, and a count mode for showing statistical information about words.
BOK0021

\$79



PowerCache (DayStar Digital)

Affordable Speed with PowerCache. The best has just gotten better. Our new PowerCache is even faster and it fits into almost any Mac, from the LC and IIs up to the IIfx...you only change the adapter board, it's completely universal. Available in 25, 40 or 50 MHz speeds, it uses the proven Motorola'030 processor for 100% compatibility with all hardware & software including System 7. Get unparalleled performance that will triple the speed of any function from graphics to spreadsheets. Math chip available. 30 Day money-back guarantee. See line listings for prices.
PowerCache 40MHz

\$949



Microphone II 3.0

Ideal for International telecommunications. Praised for its ease of use and advanced scripting language, Microphone II 3.0 now contains faster script execution, screen speed, file transfers and new interface design tools. Supports ZMODEM transfer protocol and can operate modems at any speed from 50 to 57,600 baud.
COM0043

\$215

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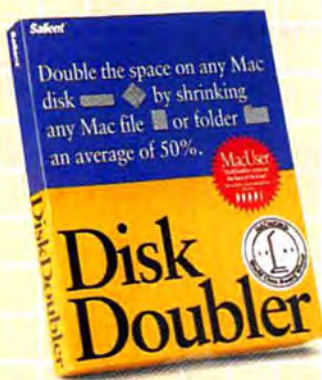
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MacPrint 1.2

Use a Macintosh with non-Apple printers. Print Mac applications on HP Laserjet, Deskjet or compatible printers including all Series IIs, IIsx and the Deskjet 500. Prints text and graphics at the printer's maximum resolution. Does not require PostScript. Cable is included. UT10098

\$95



DiskDoubler 3.7 (Salient Software)

DiskDoubler 3.7, the system 7 savvy version, compresses your files when you save them and automatically expands them when you open them. It doubles your hard disk and floppy disk storage capacity without the expense of an additional hard disk. DiskDoubler works transparently within any application, and operates in the background under MultiFinder. DiskDoubler works with documents, applications, plus sound graphics, and scanner files. UT10179

\$49

SPLAT'ERS

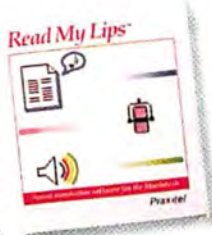
New color action game that pits you against multiple life-like opponents. It's played in a first person perspective in realistic 3-D. You are armed with a semi-automatic, compressed air powered pistol that fires balls of paint. Action involves both reflexes and strategy. SPLAT'ERS is quickly playable, never mastered, with many levels of difficulty. Runs in 16 colors. ENT0388



\$37

Read My Lips

Attach sounds to documents you create using popular word processors, desktop publishing, and presentation software. Use pre-recorded sounds or record your own. Both the built-in microphones of the new Macs as well as MacRecorder are supported. UT10211



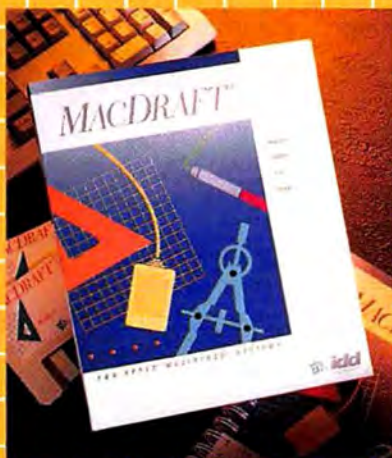
\$75



Utilities Family (Microcom)

The Virex application program detects and repairs files infected by Macintosh viruses. The Virex 3 INI repairs damaged files instantly before a virus can spread. 911 Utilities, a collection of disk and file recovery tools, protects computer-based information from loss or damage so you'll never have to worry when your Mac goes down. Complete Undelete maintains a "Delete Log" of files thrown in the trash and recovers them if they were accidentally thrown away. Citadel with Shredder, a security tool box, protects your computer from unauthorized access. Virex 3.5 UT10093 \$59. 911 UT10191 \$89. Complete Undelete UT10140 \$49. Citadel UT10233

\$89



MacDraft 2.1 (Innovative Data)

Provides the tools you need to create accurate drawings on your Mac. It supports PostScript output, has a removable geometric drawing tool palette, multiple layers (limited only by available memory), on-line symbol libraries, 44 different scales, custom line styles, dimension lines, Bezier and spline curves, automatic area calculation, and smoothing of freehand shapes. MacDraft supports 32-bit QuickDraw and custom fill patterns in both black and white and color. Reads TIFF and MacDraw II files. CAD0039

\$279

Design Your Own Home:



Design Your Own Home: Architecture, Interiors, or Landscape. Create floor plans and building plans with structural details. Do individual room plans and kitchen/bath design. Then complete your dream house with graphic landscape plans. Interiors and Landscape programs generate 4 side views from top-view perspective. Sample plans included.

\$65



The UnMouse (Microtouch)

The UnMouse does everything a mouse can—only faster, easier, and in less space. To move the cursor, simply slide your finger over the glass surface. To make a selection merely press down. The UnMouse also serves as an extended keyboard. Tap the large red button and you have a Power Keypad with 16 keys instantly available to execute macros (60 in advanced mode). With its one million touch points the UnMouse also performs as a small graphics tablet. INP0084

\$159

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ACC0565	PowerBook Carrying Case	75
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Targus, Ltd.		
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NET0145	New PhoneNET Ethernet Card-MacII	219
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NET0034	Timbuktu Remote® 3.0	135
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MD00452	Diamond Drive 210 MB Fixed Drive	1139
MD00454	Diamond Drive 510 MB Fixed Drive	2599
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MD00203	40 Meg External Hard Drive	349
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MD00206	105 Meg External Hard Drive	499
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MD00438	Spectrum/8 24 PDD Si	999
MD00439	Spectrum/24 Series III	2149
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INP0041	Seiksha SP 2000 AP Printer	235
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SuperMac		
MON0224	19" SuperMac Color Display	1799
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PowerCache 50 MHz		1459
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DR0362	Gemini Classic 25MHz 68030	1229
DR0364	Gemini Classic 33MHz 68030	1499
DR0297	Mercury 16MHz 68030 - SE	365

MODEMS & FAX

Abaton		
MOD0034	InterFax 24/96	299
Dove		
MOD0053	Dove Fax Plus	359
Global Village		
MOD0049	TelePort 2400 ADB Modem	139
MOD0058	TelePort/Fax 9600	185
Hayes		
MOD0060	Personal Modem 2400 Plus w/Smartcom	149
MOD0065	Bundle 9600 Ultra SmartModem	829
PowerUser™		
MOD0062	24/96 Mini Send Receive Fax Modem	199
MOD0043	2400 BPS Mini Modem	99
MOD0047	Mini Send Fax 2400/9600	149
MOD0071	9600 bps V.32/V.42bis Modem	399
MOD0070	2400 bps V.42bis Mini Modem	149
Prometheus		
MOD0076	ProModem 2496 S/R Minifax Plus	279
MOD0064	ProModem Ultima	699

UTILITIES & PROGRAMMING

Abbott Systems, Inc.		
UT01236	Calc+	39
UT01113	CanOpener	62
Alysis		
UT01232	SuperDisk 1.7	49
ASD Software, Inc.		
UT01135	FileGuard 2.7	139
UT01130	FileGuard 2.7 - Office Pack 5	499
UT01131	FileGuard 2.7 - Office Pack 10	799
Baseline Publishing		
UT01183	ScreenShot 1.2	39
Berkeley System Design		
UT01119	After Dark 2.0	24
UT01231	More After Dark After Dark 2.0 Bundle	45
CE Software		
UT01188	Quickkeys 2 v.2.1	94
Connectix		
UT01148	Hand-Off II 2.1	56
Fifth Generation Systems		
UT01087	SuitCase II 1.2	55
Insight Development		
UT01098	MacPrint 1.2	95
Kensington		
PassProof		ea 69
Microcom		
UT01191	911	89
UT01233	Citadel	85
UT01140	Complete Undelete	49
UT01093	Virex	59

The PowerUser Hard Drive from MacWarehouse

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DRI 0206

Manufacturer: PowerUser

\$589

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(Ask for item # CHP0012 120NS)

	STANDARD	FOR 2MB	FOR 2.5MB	FOR 4MB
	1MB SURFACE MOUNT	ADD A 1MB EXPANSION CARD	ADD A 1MB CARD & 2 256K SIMMS	ADD A 1MB CARD & 2 1MB SIMMS OR ADD A 3MB EXPANSION CARD
MACINTOSH CLASSIC				

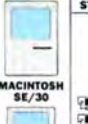

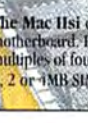
The Mac Classic comes with a standard 1MB of memory, which is surface mounted (soldered) to the motherboard. Additional memory for your Mac Classic is provided by an Expansion Board, which slides into a slot on the Classic's motherboard. The Expansion Board can be purchased with 1MB of memory (for a total of 2MB), and then two 1MB SIMMS can be added to the Expansion Board later, for a total of 4MB. Or, you can install a 3MB Expansion Board, which brings your Mac Classic up to its full 4MB.

	STANDARD	FOR 2MB	FOR 2.5MB	FOR 4MB
	4-256K SIMMS	ADD 2-1MB SIMMS	ADD 2-1MB SIMMS & 2-256K SIMMS	ADD 4-1MB SIMMS
MACINTOSH PLUS & SE				


The Mac Plus and Mac SE have four available slots on the motherboard, which originally contain four 256K SIMMS modules — totalling 1 megabyte (1MB) of memory. To upgrade, you can replace each 256K module with a 1MB module, but you must do this in pairs. Replace two 256K modules and you will have a total of 2.5MB of memory. (That's the two new 1MB modules plus the original two 256K modules.) Replace all four modules and you'll have 4MB. (You should save the 256K modules for later use if you want to pass your Mac on to someone else.)

	STANDARD	FOR 4MB	FOR 6MB	FOR 10MB
	2MB SURFACE MOUNT	ADD 2-1MB SIMMS	ADD 2-2MB SIMMS	ADD 2-4MB SIMMS
MACINTOSH LC				

The Mac SE/30, II, IIx, IIcx, and IIfx each come with a total of eight slots. The standard configuration has four 256K SIMMS modules, or a total of 1 MB. Here, memory must be upgraded in multiples of four. This allows for expansion from 1MB to 4, 5 or 8MB on the II and IIx, and up to 32MB on the SE/30, IIcx and IIfx, depending on whether you are using 1MB, 2MB or 4MB SIMMS. If you are upgrading a Mac IIfx, you must use SIMMS rated at 80ns or faster.

	STANDARD	FOR 4MB	FOR 5MB	FOR 8MB	FOR 9MB (IIfx only)	FOR 16MB (IIfx only)	FOR 32MB
	4-256K SIMMS	ADD 4-1MB SIMMS	ADD 4-1MB SIMMS & 4-256K SIMMS	ADD 8-1MB SIMMS	ADD 4-2MB SIMMS & 4-256K SIMMS	ADD 8-2MB SIMMS	ADD 8-4MB SIMMS
							
							

The Mac IIfx comes with a standard 1MB of memory, which is surface mounted (soldered) to the motherboard. Four slots are available for additional memory, and you must upgrade your Mac IIfx in multiples of four. The Mac IIfx is expandable to 5, 9 or 17MB, depending on whether you are using 1, 2 or 4MB SIMMS, and the SIMMS modules must be rated at 100ns or faster.

	STANDARD	FOR 5MB	FOR 9MB	FOR 17MB
	1MB SURFACE MOUNT	ADD 4-1MB SIMMS	ADD 4-2MB SIMMS	ADD 4-4MB SIMMS
MACINTOSH IIfx				

The Mac LC comes with a standard 2MB of memory, surface mounted (soldered) to the motherboard, with two slots available for additional memory. The Mac LC can be upgraded to 4, 6, or 10 MB, depending on whether you are installing 1, 2 or 4MB SIMMS.

**FREE STEP-BY-STEP
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Actual size: 6.5" x 4.5" x 7" (HWD)

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For bigger jobs, there's LabelWriter II Plus. Same small size, but with the ability to print on larger 2¼" x 4" and 3.5" disk labels.

The LabelWriter II and LabelWriter II Plus retail for \$249 and \$399 respectively; and are

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For more information or a dealer near you, call 1-800-4-COSTAR or 1-203-661-9700.

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Print Resolution	72 dpi x 105 dpi	138 dpi x 138 dpi
Label Capacity	130 labels per roll	up to 350 labels per roll



Assuming that you can get your hands on a PowerBook, have you thought about how you'll keep it from winding up in someone else's hands? The folks at Premier Technology ([415] 255-9300) have. The \$39.95 Lock-A-Note is a set of two special replacement feet for a PowerBook. Installing either foot is supposed to make notebook-napping "almost impossible without the destruction of the PowerBook's case." Perhaps you'd better just lock yours in your desk.

By James Bradbury

Ricardo Montalban's mouse: Trackballs have been showing up in every conceivable shape and color lately, but what about the little pointing device that started it all? For those who want to add some style (and comfort) to their rodent, the Mousglove (\$12.95), from MousTrak, is a leather mouse cover that's available in five designer colors, although hipsters will look no further than black. After all, would you rather handle a cold piece of plastic or the richness of Corinthian leather? (800) 221-6687 or (604) 420-3735. ❖ Back in trackball land, MicroSpeed has hopped on the miniaturization bandwagon with its \$89.95 MicroTrac, a trackball that's smaller than a mouse (but not compatible with the Mousglove). (415) 490-1403.

Who killed the Roget habit? Larry Belling, of Slippery Disks, that's who. His Writer's Dreamtools, to which *MacUser* gave four and a half mice in May 1990 (see "Bobker's Dozen," page 39), has a new HyperCard 2.1 version. In addition to Events Day-By-Day, Clichés and Catch Phrases, and The Slang Thesaurus, the tools now include The Stack of Lists and The Stack of Decades. The former is 1.1 megabytes' worth of lists of people, places, and things. The latter covers "facts, fads, and fashions" for each decade since 1650. All the stacks are useful for brainstorming and quick reference (we used them to check the spelling of Ricardo Montalban's name, for example). \$149. A Student's Dreamtools, which omits the slang and clichés (most students can supply these on their own), is \$89. (213) 274-3600.



Cut and paste: For those who are sick of looking at the same old desktop, Thought I Could's Wallpaper offers the opportunity to replace the standard Apple 8-x-8-pixel pattern with something a little more expansive. You can create your own patterns (64 x 64 pixels under System 6.0.5 and 6.0.7, 128 x 128 pixels under System 7) or opt for one of the hundreds that come with the package. \$59.99 (\$39 through January 31). (212) 673-9724.

Take a walk on the boardwalk: Monopoly has inspired countless computer versions (authorized and otherwise). Virgin Games has the current authorized version, and it could take first prize in a beauty contest. The game duplicates the original while adding snazzy sound effects and accounting help. The automation cuts your playing time in half while keeping intact the fun of mercilessly crushing your opponents. In fact, the only clunky things about Monopoly for the Color Macintosh are its name and its copy protection (Classic owners note: That's *Color* Macintosh). \$49.95. Also from Virgin: new authorized versions of Risk and Scrabble. (714) 833-8710. 🐭





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The Personal PowerBook

Want to pack your PowerBook with programs, hardware, and accessories that are perfect for taking your show on the road? Here's what well-dressed notebook Macs will be wearing.

By Steven Bobker



Apple's notebook Macs, the PowerBooks, have introduced a new dimension to personal Mac computing. Suddenly, everything has become smaller. The PowerBooks themselves are really tiny. The hard drives you'll find *inside* these tiny computers are only about the size and weight of a deck of cards. The physical size of these drives is matched by the amount of storage space they offer: 40 or even 20 megabytes. That's not much room, as applications and operating systems get bigger and bigger. Once you've loaded your favorite fonts, DAs, and extensions, for instance, it's easy to end up with a System Folder in the 5-to-10-megabyte range.

Making the most of a PowerBook is going to require some planning. Start by going through your System Folder with a fine-tooth comb. If you never print while away from base or use only service bureaus or desktop Macs to print at your destinations, get rid of ATM and all Type 1 printer fonts. Get rid of bit-mapped fonts larger than 24 points. The only reason to keep ATM and Type 1 fonts is if you plan to run demos that involve large or odd type sizes straight off your PowerBook.

Don't bring your screen saver along. It's simply not necessary. And get rid of all those screen-saver modules too!

On the other hand, even if you don't use security software at your base, get security software for your PowerBook. Some formatting-software packages, such as La Cie's Silverlining (but not including Apple's own,

which was used to format your PowerBook disk as delivered), allow password locking of volumes. This is minimal security and should be used only if you never keep anything sensitive on your PowerBook. Bear in mind that address lists, schedules, to-do lists, and memos are sensitive. They can do harm in the wrong hands.

Good security is provided by Magna's Empower I 4.0 or by the shareware program MacPassword. Neither is extremely cheap, but both offer good security. Empower is easier to use.

Take a good look at your regular applications and what you'll be doing on the road. Color tools, such as 24-bit-painting programs, can be left off. If you use two of a certain type of application, consider putting only the smaller one onto your hard disk. Check your software licenses. Some applications require that you own a separate copy for each computer you use them on; others allow multiple copies as long as you use only one at a time.

It's easy to put together a set of small applications. MacCalc and BiPlane are good inexpensive spreadsheet programs (see "Sensible Spreadsheets," October '91, page 106). The best compact word processor, T/Maker's WriteNow 2.2, is available separately for \$199 or as part of the \$249.95 PowerBundle, which also includes a PowerBook carrying case, Power Up Software's AddressBook Plus 2.0, ClickArt for Faxes, SoftView's Business Expense Reports, and a sign-up for America

Online. One word of warning: WriteNow 2.2 isn't 32-bit clean, so don't turn on 32-bit addressing if you're planning to use the program.

If you never use the Help files for your applications, get rid of them. However, if

the reason you never need Help is that you do use the manuals, leave the Help files alone. They're lighter than manuals.

Another useful software tool is Traveling Software's LapLink Mac III. This program (which comes with a cable) lets

you move files easily between your PowerBook and any other Mac that is also running LapLink (the package provides the software for both ends of the transfer).

And don't forget antivirus software before you hit the road. I recommend Jeff Shulman's Virus Detective/Blockade 5.0 package (Detective is shareware and is available on Zmac and other on-line services; Blockade is available only from the author). Other excellent packages are Symantec's SAM and the freeware program Disinfectant.

Which Works?

One way to save hard-disk space is to use an integrated application such as Microsoft Works, GreatWorks (from Symantec), BeagleWorks (from Beagle Bros), and ClarisWorks (from, surprise, Claris). Only the first two are available as of this writing, but the others should be out by the time you read this. I've seen them all, in either release or late prerelease versions, and they all handle basic chores: words, some graphics, databases, spreadsheet work, and telecommunications. None strikes me as outstanding.

Microsoft Works, which is more than three years old now, is showing its age and has a particularly weak telecommunications module. GreatWorks, although released, seems somehow unfinished. BeagleWorks and ClarisWorks have certain similarities (aside from their prerelease status). Both look to be better than the Microsoft and Symantec entries. One major difference between them is that BeagleWorks lets you use just the modules you need whereas Claris forces you to load all of them each time. The memory savings while using BeagleWorks can be impressive. Saving RAM is very important in 2- and 4-megabyte configurations.

Claris has done some nice work on its interfaces, and if you already use Claris applications, you'll find ClarisWorks easy to learn. Likewise, if you decide to move up from ClarisWorks to the higher-powered products in the Claris line, you'll have a substantial head start on the learning curve.

None of the various Works programs has a telecom module that's good enough for regular use. The shareware Zterm (available in Library 1 of Zmac's Download & Support Forum) is superior to all of them. For those who have a bit more space and money, Hayes' Smartcom II 3.3 is fairly compact and as good a telecom program as you can buy for the Mac.

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RAMPing Up

Odds are that your PowerBook came with less RAM than you have in your base machine. You won't go wrong by increasing your PowerBook RAM as much as possible as soon as possible. Although they ship with either 2 or 4 megabytes of on-board RAM, all three PowerBooks can use up to 8 megabytes apiece. Apple has chosen to provide only 2- and 4-megabyte RAM upgrades, which cost \$399 and \$899, respectively. You don't want to buy Apple-brand memory until you've checked out the pricing of PowerBook-RAM upgrades from reputable third-party suppliers who will be offering 2-, 4-, and 6-megabyte upgrades. Third-party prices hadn't been determined as of this writing, but historically Apple's prices have always been higher.

If you have a PowerBook 100 or a 2-megabyte PowerBook 140, you must add at least 2 more megabytes of RAM *right away*. Now. This minute. Put this down, and make the call before you read another word. Even if it means paying Apple's prices. That's because the PowerBooks require System 7.0.1 or later.

Yes, Apple says that System 7.0 requires only 2 megabytes of RAM, and technically that's correct. Two megabytes of RAM lets you run one application at a time. If you have lots of extensions, though, larger applications won't have room to work. And a single memory-cramped application isn't what System 7.0 is all about. Real, efficient System 7.0 use requires a minimum of 4 megabytes.

Getting On-Line

If you're planning to travel with your PowerBook, you need a modem, if for no other reason than that it's the ultimate laptop backup device. The easiest method is with the AppleTalk Remote Access software that comes with the PowerBooks. With it you can back up (at 9,600 bps) to a server or to your desktop hard drive. Another way is to get yourself a subscription to any large national on-line service that allows file transfers (that leaves out Prodigy). Naturally, I suggest MacUser's own on-line service, Zmac, which can be reached by either a local call or a toll-free call from anywhere in the country. Then, while on the road, you can send yourself electronic mail consisting of your work files. If you get back and discover that all your disks have been wiped out by some airport security machine's huge magnetic field or by a spilled can of Jolt cola, you'll

have all the work that counts waiting for you in your electronic mailbox.

The PowerBook 170 comes standard with a decent 2,400-bps data/9,600-bps fax-send modem. That same modem is available as an option for the 100 and the

140. Internal modems can't be misplaced—they're not a separate item that must be carried. Third parties are offering internal modems for the PowerBooks too.

You can, of course, use an external modem; some great cheap travel modems

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are available. They are phone-line- and/or battery-powered. The best that I've come across are the WorldPorts from U.S. Robotics. These come in all speeds, and some have fax abilities. For those on a budget, I recommend the cheapest WorldPort 2,400-bps unit. Extra capabilities such as V.42, V.42bis, MNP 4, and MNP 5 are unnecessary if you plan to communicate mostly with on-line services.

On the Case

The PowerBooks don't come with a case. Indeed, Apple doesn't even offer one as an option. That doesn't mean that you shouldn't protect your PowerBook, though. The polycarbonate case is strong, but the screen is breakable and a broken screen is expensive to repair.

Always carry your PowerBook inside something. An ordinary hard-sided briefcase works well, allowing room for the AC power adapter, cables, and disks. The closed height of the larger PowerBooks is roughly 2.5 inches. Thus, even a thin briefcase will work.

Several specialized laptop cases are available too, including the one I already mentioned as part of T/Maker's Power-Bundle. These are typically made of strong waterproof nylon, have foam inserts, and provide space for a small inkjet printer or plenty of papers and books. The best I've seen are made by Tenba, the New York City camera-bag maker. In particular, consider model 416.

The AC power adapter fits neatly beside a PowerBook 140 or 170 in a case. The only problem is that the plug prongs stick out and are likely to catch, scratch, and tear things. Go to a hardware store, and buy a two-prong-to-three-prong-plug adapter. Look for one with a rubberized case (an orange one is best; it's harder to misplace). You'll need to cut off the adapter's prongs. If you don't have a tin snip or other cutting tool, ask someone at the hardware store to do it for you. You now have a way to cover the adapter prongs for packing.

Keeping Connected

Cables are most efficiently stored in a small nylon envelope or bag of the sort sold in outdoor-equipment stores. For the ultimate in cabling, Farallon sells a fairly expensive (\$495) but very useful kit called the Portable Pack. It includes two phone cables, two modular phone Y splitters, two modular cable extenders, a phone cable with a modular plug on one end and alligator clips on the other for those really

The PowerBooks don't come with a case. Indeed, Apple doesn't even offer one as an option. That doesn't mean that you shouldn't protect your PowerBook, though.

old installations, two PhoneNet connectors, a 3-to-1 electrical tap, a screwdriver, a Swiss Army knife, an excellent connecting guide, a PhoneNet-to-LocalTalk adapter, and copies of Timbuktu and Timbuktu/Remote. Everything fits neatly into a small nylon pouch. If you don't need Timbuktu, you can gather together the individual pieces for less, but the convenience is nice.

Easter Eggs

Easter eggs are neat little things that programmers like to hide in their work. Typically they're somewhere in the About box, and typically they're hard to find — you've got to look for them. That's where the name comes from. You need to hunt them down. They're rarely useful, but they will make you smile. And a smile is always good.

Each month I'll share one or two of them with you. If you know of one that you'd like to make public and you don't mind your name in print, send it to me. I can be reached electronically at 72511.45 on Zmac, or you can write to me care of MacUser.

This month's treat is found in Excel 3.0. Do the following: Open a new worksheet. Select any cell. Change its style to Excel, using the Style command on the Format menu. Open the About box. Click in the Excel symbol. Wait a few seconds. Don't click too fast to make it go away; there are two screens here.

There's a second Easter egg in Excel 3.0. I'll tell you how to find it in an upcoming issue. If you find it on your own, please let me know. One clue only: You can ignore the About box when looking for this one.

And you thought that Microsoft was stuffy? ☞

Steven Bobker runs Raw Fish Systems. He has been writing about Macs since 1985 and is at least as devoted as Apple is to low-end Macs and their users.

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How to Buy A Low-Cost Printer

It used to be that when you wanted a low-cost printer, you had one choice: a dot-matrix printer, which was noisy and slow and had low resolution. Luckily, printer prices are falling, so if you're in the market for a low-cost printer but don't want to sacrifice quality, you can now consider a new generation of non-PostScript laser and inkjet printers (also called QuickDraw printers). These printers are strictly for personal use — in most cases, you can't hook them up to a network — but with prices dipping well below \$1,000, one of these desktop printers could be right for you.

By Victoria von Biel

? A laser printer uses an array of laser beams to draw images on a metal drum, applies toner to the drum, and then prints the images on the page. An inkjet printer sprays dots of ink on the page — because the dots are larger and closer together than the dots used by dot-matrix printers, the output looks much better.

\$ Most QuickDraw printers (except for the Hewlett-Packard DeskWriter) do not include a LocalTalk connection, so they cannot be networked. There is a way around this, however, in the form of Gizmo Technologies' Shadow Writer (\$179), a software-only package for printer sharing that works with Apple's Personal LaserWriter LS and SC.

! Inexpensive printers (\$1,000 or less) are not PostScript-compatible, and they rely on the Mac's microprocessor and built-in QuickDraw capabilities to perform image processing. As a result, QuickDraw printers can be slow (depending on how powerful your Mac is), and unless you use software that adds

PostScript capabilities to your printer, you won't be able to print PostScript type or graphics.

\$ Don't worry that you won't be able to use outline fonts or

graphics created in such programs as Adobe Illustrator and Aldus FreeHand. If you're using System 7, you'll be able to print outline fonts, and with the agreement between Adobe and Apple, ATM (Adobe Type Manager) technology will be included in future versions of system software, so you'll be able to print Type 1 fonts as well. Freedom of Press Light, from Custom Applications, gives you full PostScript capability when you're printing graphics and text, but be forewarned that printing is very slow.

✓ The higher the printer's resolution, the better-looking the output. Most laser printers print at 300 dpi (dots per inch). Inkjet printers' resolution ranges from about 180 dpi to 360 dpi. Dot-matrix printers print at 144 dpi. Bear in mind, however, that the application you're printing from must be able to send output to the printer at the higher resolution; otherwise, documents will print at your screen's resolution: 72 dpi.


? Laser and inkjet printers have upkeep costs — toner and drums for laser printers and ink cartridges for inkjet printers. Find out how much these items cost, how often they need to be replaced, and how easy they are to buy. Some printers have reusable toner and/or ink cartridges.

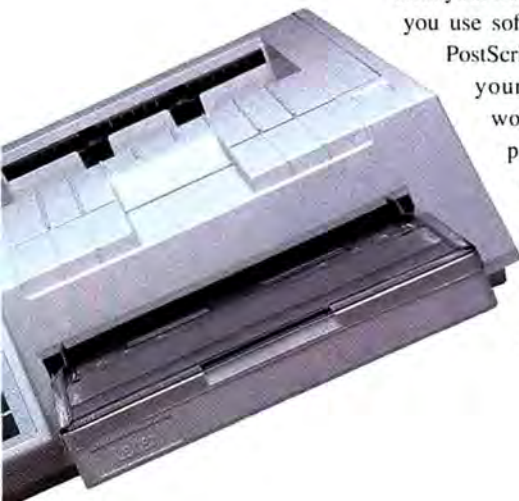
\$ According to MacUser

Labs tests ("High-Quality Low-Cost Personal Printers," September '91, page 150), a page printed on a laser printer costs less than one printed on an inkjet printer. Although a laser printer's toner and drum are more expensive to replace, these components last longer than an inkjet printer's ink cartridge.

✓ Find out if you can use a spooler with your printer (a spooler processes a print job in the background while you work on something else). Whether or not you can use a spooler depends on the driver software that's included with the printer. Some drivers have a spooler built in, some let you use third-party spoolers, and others cannot support a spooler at all.

? Before you go shopping for a printer, decide what you'll be using it for — mainly text, or text and graphics. Take a floppy disk containing some work samples you can print on several printers. Also take some sample output from a high-quality laser printer to use for comparison.

✓ When comparing output from various printers, check to see how clearly text prints at small font sizes as well as how clearly each printer outputs line art and gray-scale images. You may need a magnifying glass to closely check differences in quality among printers. 



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POWER TOOLS

If Apple's PowerBooks are still too big or too expensive for you, you may be interested in Psion's nine-ounce pocket PC, which costs less than \$500. The Series 3 comes with a word processor and a database program as well as a serial port so you can link it to your Mac. Two AA batteries should keep you powered up for two months, and optional memory cards hold as much as 2 megabytes of storage. \$425 to \$495. (800) 628-7949 or (203) 274-7521.

By John Rizzo

The pinnacle of partitioning: For years, La Cie's Silverlining has been the power user's hard-disk utility of choice for doing such things as formatting and creating partitions, but Hard Disk ToolKit (\$199.95), from FWB, may usurp Silverlining's position at the top of the heap. Not only does the eight-module Hard Disk ToolKit create partitions but it also lets you tweak your drive at the nitty-gritty hardware level, even allowing you to adjust your drive's RAM cache to speed up performance. Benchmarks tell you if your fiddling has accomplished anything. You really have to know what you're doing to take advantage of much that this package offers, but the 250-page manual helps. (415) 474-8055. ✖ The best bargain in formatters is Drive7 (\$69), from Casa Blanca Works. Drive7 is the formatter for the rest of us — it's easy to use and does a good job of creating partitions. Unlike Hard Disk ToolKit, Drive7 doesn't reformat removable cartridges, but it can update the driver on SyQuest cartridges so they can be read by any SyQuest drive, regardless of vendor. (415) 461-2227. ✖ Formatter5 (\$150), from Software Architects, is adept at formatting SyQuest, erasable optical, and other removable cartridges. Information about specific brands of drives is written into the utility, thus ensuring a high degree of compatibility. Formatter5 also lets you create DOS and Mac partitions on the same cartridge. (206) 487-0122.



Art directions: Start looking for high-end-graphics features in low-cost products. MicroFrontier's Color It! (\$120) is a 32-bit painting program that contains some of the image-processing features of Adobe Photoshop, such as masking and the ability to retouch scanned images. The 15 levels of undo are a nice touch for those of us who aren't exactly Picasso. (515) 270-8109. ✖ Paracomp's SwivelMan (\$895) is a 3-D-modeling and -rendering package that comes with SwivelPro 2.0 and MacRenderMan, the industry standard in photo-realistic rendering. SwivelMan is more than just two programs in a box — you can apply some of MacRenderMan's rendering power from within SwivelPro, thus avoiding MacRenderMan's Byzantine interface. Swivel Pro does this by letting you apply preset "shaders" to objects — wood-grain, marble, and other patterns that are more complex and realistic than surface maps (SwivelPro lets you alter the swirl of your wood grain with the flick of a slider bar). Also included is the QuickPICS sound/animation-compression utility for the multimedia maniac in you. (415) 956-4091. ✖



The Incredible Shrinking File

Confused by all the compression formats used by on-line services? Here's a guide to the ABCs (and the SITs and SEAs) of unsqueezing your files.

By Ross Scott Rubin






You've bought a modem, you've signed up for an on-line service, and you're ready to start downloading those juicy public-domain programs. Everything goes fine until it's time to actually start using the program you've downloaded, at which point your Mac tells you that the file couldn't be opened because the application that created it is missing. What's going on? Most likely it's because the file has been *compressed* so it takes up less space, and if you don't have a program that can "expand" it, you're out of luck.

Compressed (or *archived*) files take up less

space (so you can fit more on a floppy or your hard disk, for example); can contain more than one file; and take less time to upload or download, thus saving you connect time and money. And because several compression products are available as shareware, you don't even need to go out and buy more software if you want to compress and decompress files. Even better, a few programs now create self-extracting archives — just double-click on the icon, and the files expand to their proper size.

In the good old days, almost everyone used the shareware compression product StuffIt

Table 1: Compression Formats

Extension and icon	Description	Open files with	Source
COMPRESSED (Files retain original icon.)	AutoSqueeze If you add the COMPRESSED suffix to a file, AutoSqueeze will automatically compress it. Similar to SuperDisk!	AutoSqueeze	Available from on-line services and user groups. Shareware fee, \$20.
.CPT 	Compact Pro This shareware archive utility by Bill Goodman has won over many on-line users with its combination of speed and tightness. Compacted files can be opened from any Open dialog box with Now Utilities' Super Boomerang. Goodman has also written a freeware program, CptExpand, that can decompress these files.	Compact Pro, CptExpand (freeware), Super Boomerang (Now Software)	Compact Pro and CptExpand are available from on-line services and user groups. Compact Pro, shareware fee, \$25; CptExpand, free.
.DD 	DiskDoubler Salient pioneered on-the-fly compression (automatic file compression and decompression). The DiskDoubler format is becoming more common on public bulletin-board services. DiskDoubler files rarely sport the .DD extension.	DiskDoubler, QuicKeys 2 (CE Software),* StuffIt Deluxe,* SuperDisk! Utilities (Alysis)*	Salient Software, 124 University Ave., Palo Alto, CA 94301; (415) 321-5375. \$79.
.HQX 	BinHex BinHex is not a compression utility; rather, it's a format that converts Mac binary files to a character-based format that can be used on systems that don't accept MacBinary. BinHex files are often larger than the files they produce when decoded.	BinHex (shareware), Compact Pro, StuffIt Classic, StuffIt Deluxe	BinHex is available from on-line services and user groups. Shareware fee, \$10.
.PAK 	PakWorks PakWorks is a new product that promises faster compression times.	PakWorks	Small Miracles, Box 625, Old Greenwich, CT 06870; (203) 967-8260. \$79.95.
.PIT 	PackIt III Before there was StuffIt, there was PackIt. This format is seldom seen these days.	Compact Pro, PackIt III, StuffIt (Classic and Deluxe)	Available from on-line services and user groups. Shareware fee, \$20.

*Additional software may be required. Contact the publisher for information.

(now called StuffIt Classic, not to be confused with the more full-featured commercial version, StuffIt Deluxe, from Aladdin Software). StuffIt was developed by wunderkind Raymond Lau, at the tender age of 15, and instantly became the compression standard. It's still widely used, but it's been joined by other compression and archiving products, each of which promises to push the limits of performance and convenience for power users.

How can you tell if a file has been compressed? Easy — compressed files







often include a period and then a three-letter suffix (or filename *extension*), which tells you what program was used to compress the file. StuffIt files, for example, should include the extension .SIT. You may also be able to tell by the file's icon, which is usually that of the program that compressed it. That's where the easy part ends, however, because the broadening compression-utility market has created an alphabet soup of filename extensions and icons. Confused? Take a look at Table 1, which covers the most frequently used

compression products as well as a few new ones. (Note that the table does not include specialty compression products, such as those specifically for graphics and animation files.)

Compression utilities aren't just for uploading and downloading files. Another important use is for archiving files (on floppy disks or tape, for example) as well as freeing up space on your hard disk. ☞

Ross Scott Rubin is a New York-based free-lance writer and microcomputer analyst.

Table 1, continued

Extension and icon	Description	Open files with	Source
.PKG 	AppleLink AppleLink "packages" are used almost exclusively on Apple's network, because the AppleLink software can create and decompress these files itself. A StuffIt Deluxe translator can help those not on AppleLink.	AppleLink, StuffIt Deluxe*	Apple Computer, 20525 Mariani Ave., MS:47B, Cupertino, CA 95014; (408) 974-3309.
.S, .X (Files with .s suffix retain original icon.) 	SuperDisk! To compress a file or folder with the SuperDisk! control panel installed, just append .s to its name (SuperDisk! uses .x to mark its self-extracting archives).	SuperDisk!	Alysis Software Corp., 1231 31st Ave., San Francisco, CA 94122; (415) 566-2263. \$89.
.SEA (Icon varies, depending on utility that created the archive.) 	Self-extracting archives Compact Pro, Diamond, DiskDoubler, PakWorks, StuffIt Classic, and StuffIt Deluxe can create self-extracting archives that automatically decompress when you double-click on them. Creating an .SEA can add (sometimes greatly) to the file's size. The utility DeSEA can reconvert most .SEAs to their native format.	A double-click on the icon or use of DeSEA.	Available from on-line services and user groups. Free.
.SIT  	StuffIt Classic, StuffIt Deluxe The shareware StuffIt Classic and commercial StuffIt Deluxe are venerable standards for archiving files. StuffIt Deluxe's open architecture includes a scripting language and translators for popular DOS and Mac compression formats. UnStuffIt is a freeware product that can open StuffIt Deluxe archives. Aladdin has a new archiving program, SpaceMaker, that transparently compresses files that include a user-designated prefix or suffix. Files retain their original icon.	StuffIt Classic: Compact Pro, DiskDoubler, StuffIt Deluxe, SuperDisk! Utilities StuffIt Deluxe: HyperCard (Clarisc),* MicroPhone II (Software Ventures),* QuickKeys 2 (CE Software),* ShortCut (Aladdin Systems), UnStuffIt	StuffIt Classic and UnStuffIt are available from on-line services and user groups. StuffIt Classic, shareware fee, \$25; UnStuffIt, free. StuffIt Deluxe available from Aladdin Systems, 165 Westridge Dr., Watsonville, CA 95076; (408) 761-6200. \$99.
.J 	Diamond Popular in Europe, Diamond is a new player in the U.S. Although slower at packing files than some other utilities, it compresses files efficiently.	Diamond	Sextant Corp., 1501 Laurel St., Sarasota, FL 34236; (813) 954-5622. \$75.

How to Master 20 Popular Macintosh Programs Without Ever Reading The Manuals

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Over the past four years I've been associated with over 50,000 people attempting to learn the Macintosh computer. I've watched as each person wages their own personal, private battle to master the computer and the most popular Macintosh programs.

I've seen their frustration, have empathized with their confusion, and understood their computer fears. I've talked to workers who have had new computers and new programs simply dropped on their desk with the directive to, "learn this." I've listened to people who have struggled night after night trying to read and understand a computer manual. Can you imagine trying to understand and master 4th Dimension from the manual?

You would be surprised at the number of people who have confided with me the fact that they've given up trying to learn some of the programs. They put the box on the shelf and write the expenditure off as a bad investment.

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Can you imagine how much money has been wasted on programs and computers that are sitting abandoned? Right now think of the people working on Macs in your office. Do they really understand the computer? Do they know what to do when it goes down? How many programs are each of your people using? Have they really mastered the programs they're using? Do they know the short-cuts and valuable techniques that will save you time, money, and increase your professionalism?

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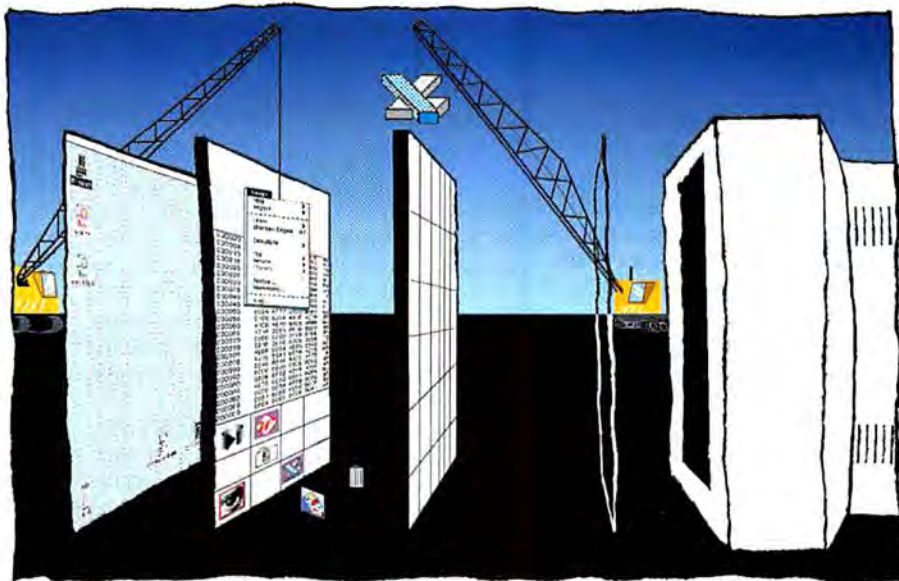
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Word 4.0 Part 2	

ResEdit 101

Welcome to a short course in using ResEdit. If you've never tried it, this'll get you started. And even if you're an experienced ResEditor, you may just learn something.

By Bob LeVitus



Don't you hate it when Apple leaves something important — such as a keyboard command equivalent for Make Alias — out of the system software? Sure it's annoying, but thanks to the voodoo of ResEdit, you don't have to live with such omissions.

ResEdit, in case you're wondering, is Apple's resource-editing software. All Mac software contains resources, which create things such as menus, cursors, icons, dialog boxes, and so on. When you're adept with ResEdit, you can edit menu items, colors, desktop patterns, and keyboard command equivalents; alter wording in dialog boxes; create and modify icons; and so on (see "Return to ResEdit," December '90, page 273).

You can get ResEdit directly from APDA (the Apple Programmers and Developers Association) for \$49.95. Contact APDA at (800) 282-2732 or (408) 562-3910. And if you have a modem, you can download the latest version from CompuServe, America Online, or GENIE. Try your user group too.

For those who don't have a modem or a user group, BMUG (Berkeley Macintosh User's Group) offers a \$15 package that includes ResEdit and BMUG's excellent book *Zen and the Art of Resource Editing* as well as several utilities and a beautiful collection of icons and jumbo desktop patterns. Contact BMUG at 1442A Walnut Street, Suite 62, Berkeley, CA 94704; (510) 549-2684.

Obligatory Warning: ResEdit is powerful juju. It can do lots of cool stuff, but it can also

destroy your files. *Never* use ResEdit on a master or original file; *always* work on a copy. Move the original file into a safe storage folder or onto a floppy disk, just in case you ever need it again. If you've altered the System file, you'll have to move the old System file off your startup disk, because the Mac doesn't like seeing multiple System files or folders when it starts up. And of course, make sure you have handy a bootable floppy disk containing a stripped down System file for emergency startup. (If all this has given you a touch of ResEditophobia, don't worry — I'll also show you a nifty utility that lets you edit menus *without* ResEdit.)

By the way, the descriptions that follow refer to version 2.1 of ResEdit or later. If you have a different version, some of these hacks may not work.

Easy Hacks

We'll start with something easy and fun. Under normal circumstances, the desktop pattern contains a series of 8-x-8-pixel grids, which you can edit in the General Controls control panel (usually located on the Apple menu). ResEdit lets you increase each grid's size to as much as 64 x 64 pixels, which allows you to create much more detailed desktop patterns (for example, you might re-create your company's logo as your desktop pattern). You can also paste in a picture (as large as 64 x 64 pixels) from the Clipboard and use that as your desktop pattern. Here's how:

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POWER TOOLS

BEATING THE SYSTEM

1. Launch ResEdit, and open a copy of the System file.

2. Double-click on the ppat resource, and then double-click on the resource with the ID number 16. This opens the pattern editor.

3. Choose Pattern Size from the ppat menu. Choose a new pattern size in the dialog box, and then click on the Resize button.

4. Create a new pattern in the pattern editor, or paste in a picture from the Clipboard. (If you paste in a picture that's bigger than the size you set, you'll see only one corner of it. To get around this, choose Command-A [Select All] from the Edit menu — ResEdit will resize the pasted picture to fit the area you've selected.) To see how your new desktop looks, choose Try Pattern from the ppat menu.

5. When you're satisfied, choose Save from the File menu and quit ResEdit. Move the edited copy of the System file into your System Folder (you may have to boot from a floppy to do this), and restart your Mac.

That hack was purely cosmetic, but here's one that's useful too. When you double-click on a generic text or PICT document in the Finder, you get a message that tells you that the document couldn't be opened because its application couldn't be found and then asks if you want to open the document in TeachText. Most of the time, you'd rather open it with your word-processing, painting, or retouching program, wouldn't you? If so, all you have to do is change the associated creator code in the Finder's fmap resource. Here's how to do it:

1. Launch ResEdit, and open a copy of the Finder file.

2. Double-click on the fmap resource, and then double-click on resource ID 17010.

3. Notice that the first line displayed on the far right side is TEXTtxt. Since txt is the creator code for TeachText, all you have to do is drag-select those four characters and replace them by typing in the four-character creator code of your favorite word-processing program (see Figure 1). For example, Word is MSWD, Nisus is NISI, and MacWrite II is MWII. (To find an application's creator code, use ResEdit to open a document created by that application and choose Get Info.)

4. While you're messing around, change the txt after PICT in the second line to match the code of your favorite graphics application that can read PICT files. For example, MacDraw Pro is dPro, Canvas 3.0 is DAD2, and Photoshop is 8BIM.

Note: Type the creator codes exactly as shown — using uppercase or lowercase letters actually matters here.

5. Save the file, and quit ResEdit. Move the edited copy of the Finder file into your System Folder (you may have to boot from a floppy to do this), and restart.

The Finder even knows to substitute the name of your application for TeachText in the dialog box. Now it'll read, "The document X couldn't be opened, because the application program that created it couldn't be found. Do you want to open it using Microsoft Word?" (or whatever program you've chosen).

Thanks to Kevin Norris, who sent me this tip via Zmac.

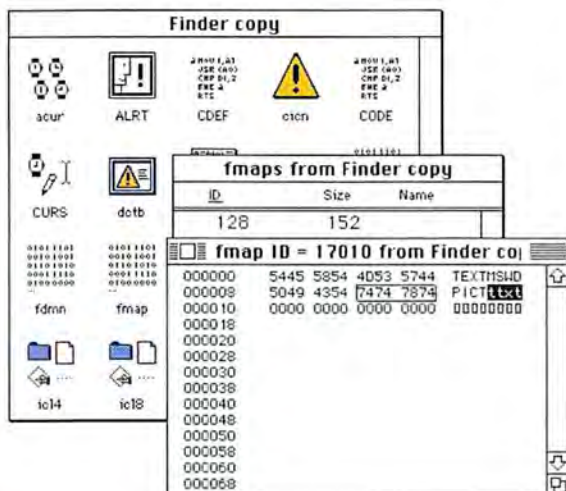


Figure 1: Under System 7, generic text and PICT files open in TeachText, but you can edit the Finder's fmap resource so they open in the program of your choice. In this example, the resource has been edited so that text files will now open in Microsoft Word (indicated by the characters MSWD). The highlighted text shows where you would add a graphics program's creator code.

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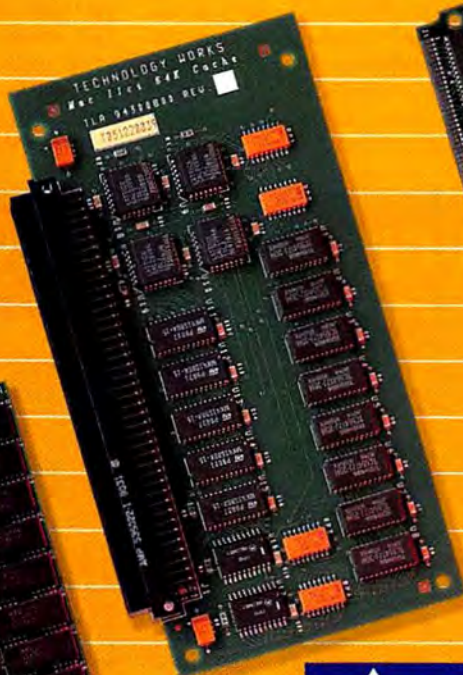


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BEATING THE SYSTEM

The System 7 File: More Fun with ResEdit

ResEdit 2.1 gives you the tools to tinker with System 7's new interface, and with a little effort you can accomplish almost any tweak you want. To get you started, Berkeley-based ResEdit expert Mark Simmons has written "Five ResEdit Tips," a guide to ResEdit that includes step-by-step instructions on five such customizing techniques as well as sample resources to illustrate each tip. "Five ResEdit Tips" lets you

1. Decorate your desktop with a selection of 16-x-16-, 32-x-32-, and 64-x-64-pixel patterns.

2. Create your own startup screens, in any size or color you desire.

3. Graft icons onto files, clean up icons, touch up small icons, and use the BNDL

(bundle) resource to globally assign color icons to documents.

4. Assign color startup icons to old INITs and control panels so you have something pretty to look at while you wait for your Mac to start up.

5. Master the TMPL (template) resource and edit new and unknown resource types.

Each of the above techniques is illustrated with sample resources; among these is a template for editing the new Finder menu resource (the enigmatic fmenu), thereby adding Command-key shortcuts to the Finder's File, Edit, and Special menus. "Five ResEdit Tips" is available exclusively from Zmac—look for RESED5.SIT in Library 7 (Reference).

Making a Meal of the Menu

Now for the good stuff—editing menus. ResEdit makes it simple to edit the menus in most applications with a menu editor that allows you to quickly and safely alter item names, keyboard command equivalents, text colors, and check marks.

Unfortunately, some programs, notably the Finder and most Microsoft products, have menus that are much harder than others to edit. Fortunately, Microsoft Word includes its own menu editor with the Commands option and there are a couple of tricks for editing Finder menus.

Let's start with something easy, such as adding a Command-key shortcut for Save As to a copy of TeachText (you can extend this technique to many other applications).

1. Launch ResEdit, and open a copy of TeachText.

2. Double-click on the MENU resource, and double-click on the picture of the File menu (it should have a small figure 2 beneath it). This opens the menu editor.

3. Click on Save As in the picture of the menu at the right of the menu editor, and then click in the text-entry box next to Cmd-Key and type the Command-key shortcut you want to assign to Save As. Be careful not to choose a key that is in use elsewhere in the program. After examining all the menus and determining that it wasn't used elsewhere, I chose the letter E.

4. When you're satisfied, quit from ResEdit, saving the file when prompted.

That's all there is to it. The next time you use TeachText, Command-E (or whatever you've chosen) will invoke the Save As command. By the way, you may have noticed that this resource lets you add

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color to the text and Command-key shortcuts as well as add icons.

Now for the coup de grace: editing the Finder's menus. A variation of this technique appeared in Tip Sheet in November '91 (page 231), but in case you missed it, here it is again (for more on editing the Finder's menus, see the "System 7 File: More Fun with ResEdit" sidebar).

1. Launch ResEdit, and open a copy of the Finder file.

2. Double-click on the *fmnu* resource, and then double-click on ID 1252. This brings up a window filled with arcane text and numbers.

3. In the far right column of text, you'll notice some familiar strings from the Finder's File menu, such as New Folder, Close Window, and other commands. The Command-key shortcuts for these (and all other Finder menu items) are stored in the third character *before* the name of each item — the *N* before *New Folder* and the *W* before *Close Window*, for example, are what determine the Command-key shortcuts for these options. A menu item with

no Command-key shortcut just has an empty box in the appropriate place.


4. To change or add a Command-key shortcut, select the appropriate character in the right-hand column and type in capital letters the key you want. It's important that you select *only* the character you want to replace. If you put the cursor to the right of the character, delete it, and then replace it, the Finder may reorder your menus or behave in other unpredictable ways.

5. Save the changes, quit ResEdit, move the edited copy of the Finder file into your System Folder (you may have to boot from a floppy to do this), and restart your Mac. The new Command-key shortcuts should show up in the menus once the new Finder has loaded.

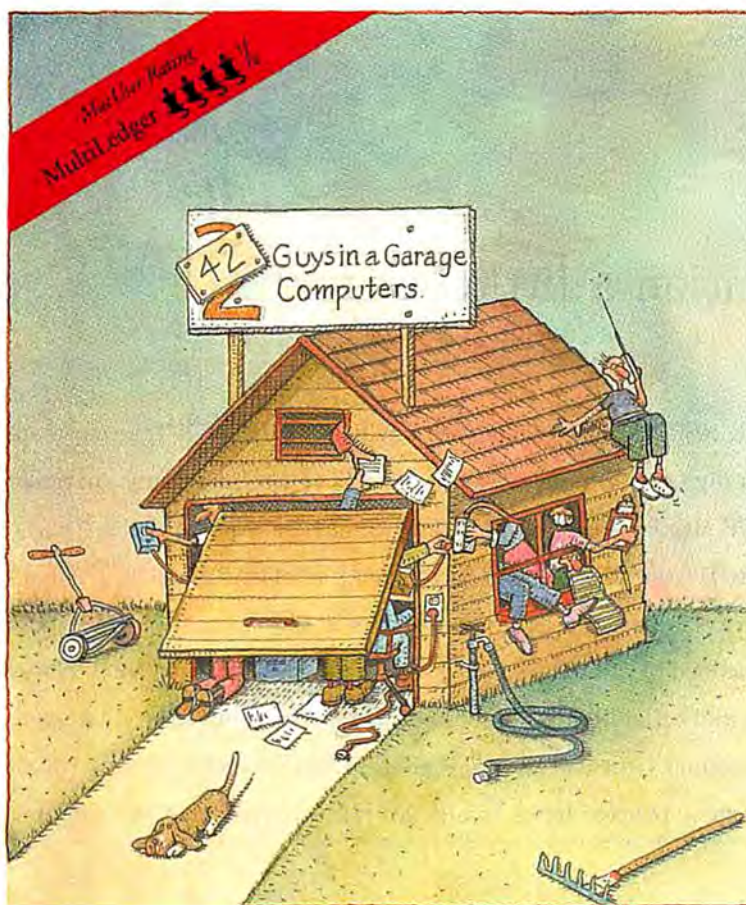
This technique works on the other Finder menus as well. The Edit menu is ID 1253, and the Special menu is ID 1255. (Thanks to Joshua Smith, of Irvine, California, for the original tip.)

If you don't want to dirty your hands with ResEdit, check out Adam Stein's shareware program Finder 7 Menus!. You

can download a demo version from *MacUser's* on-line service, Zmac, and other on-line services and user groups, or you can send \$11 to Stein at 126 Calvert Avenue E., Edison, NJ 08820. Finder 7 Menus! lets you change Command-key combinations or add them to the menus of the System 7 Finder without ResEdit. It's an easy-to-use little application — just double-click on it, and open a copy of the Finder. The File, Edit, and Special menus appear in the menu bar. Choose the menu item you want to modify, and a dialog box appears. Enter a key, press OK, and quit. Now move the modified copy of the Finder into the System Folder, and reboot. That's all there is to it.

Now that you have an introduction to ResEdit, you should play around with it a little — using your ResEdit expertise is a sure-fire way to make friends and influence people. 

Bob LeVitus is the author of *Dr. Macintosh* (second edition) as well as the just-released *Marvelous Macintosh Games*.



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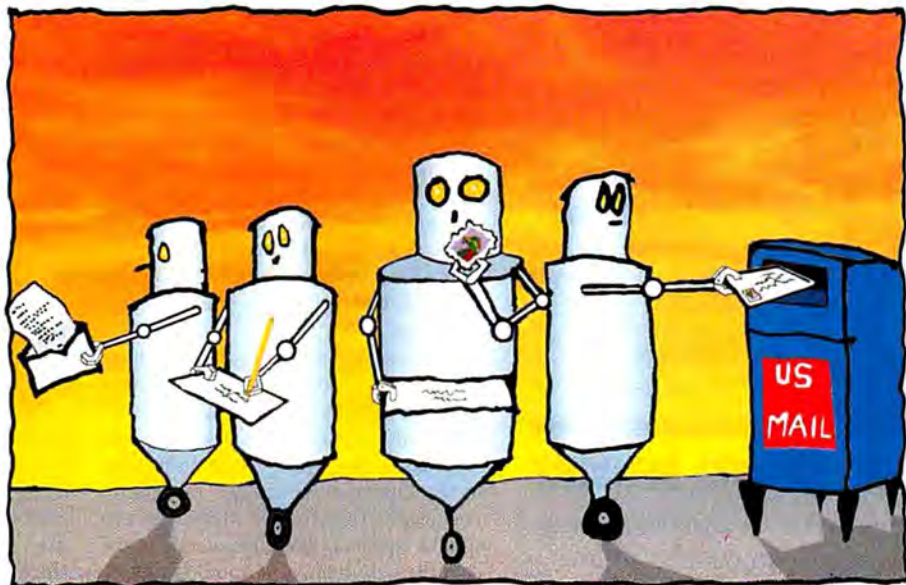
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Power Macros

Forget keyboard shortcuts; it's time to start thinking of your macro-making application as a high-level programming language. Here's how to get the most out of QuicKeys 2 and Tempo II Plus.

By Craig Danuloff



The introduction of System 7's Apple events and the promise of upcoming user-scripting products such as AppleScript and UserLand's Frontier raise the intriguing possibility of creating your own mini "programs" that customize the way your Mac works. Although these new tools may dramatically expand your horizons, it's already possible to automate many of the tasks you routinely perform — even some of the most complex ones. In fact, you probably already own the tools this automation requires: the macro-making program QuicKeys 2, from CE Software, or Tempo II Plus, from Affinity Microsystems. (Interestingly, QuicKeys 2.1 and Tempo II Plus 2.1 already include direct support for Apple events, the protocol that allows two-way communications between System 7-savvy applications. However, because applications that support Apple events are scarce, this ability is of limited use right now.)

It's easy to think of these macro programs as utilities that simply let you assign keyboard shortcuts to basic Mac tasks such as choosing menu commands, launching Fkeys, or typing your name. But in fact, both programs can take charge of much more complex tasks — from batch-processing data files to linking programs.

QuicKeys 2 and Tempo II Plus let you include any basic Macintosh action (such as menu commands, dialog-box options, mouse clicks and drags, and keyboard entries) in your macros. Each action can be defined precisely

— menu commands can be specified by command name or by relative position; dialog-box options can act intelligently, based on the existing state of the option; and mouse drags can be relative to a specific window or positioned absolutely on the screen. With QuicKeys Extensions and Tempo II Plus External, you can even automate tasks such as jumping directly to a certain folder in any standard dialog box, playing a sound, and pasting in the current time and date.

More importantly, both programs let you link any number of these actions as well as control the way they're replayed. QuicKeys 2 calls its linked macros Sequences, and they include controls that repeat macros, pause during execution, and execute macros at specific or relative times. Tempo II Plus doesn't differentiate between a single-action and a multistep macro — its macros can include any number of steps. Tempo II Plus also provides a more robust collection of control structures, most significantly the ability to conditionally branch to any other macro.

Conditionally repeating or branching means that the macro decides what to do next based on some specified criterion. You can, for example, create a macro that imports data into a spreadsheet; performs calculations; and then runs one type of report or another, depending on the results of the calculation. This ability to progress conditionally makes Tempo II Plus the best choice for more-sophisticated macros.

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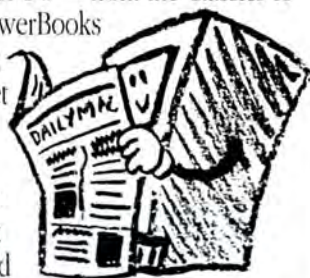
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POWER TOOLS

POWER PROGRAMMING

Problem Solving

Once you understand the potential your macro utility offers, it's time to start looking at tasks a macro program can automate. Here are a few suggestions:

Text Formatting. Few computer users have escaped the boring task of reformatting ASCII data files from another computer system, an on-line service, or a database. Using a macro to format the text can save hours of work and ensure consistency. To create a formatting macro, first determine the recurring pattern of keyboard commands that will format the text as you want. This sometimes means learning a few keyboard equivalents you don't normally use.

Suppose, for example, that you have hundreds of unformatted records and need to format them in Microsoft Word for use in a catalog. Example 1 shows the steps required to perform the formatting correctly. Once you've created the macro, you need to specify how often the macro should repeat so that each record in the data file is formatted. If you don't know the exact number of records you have and you're using QuickKeys 2, you'll just have to guess how many times the macro will need to repeat. If you're using Tempo II

Plus, however, you can use conditional branching to instruct the macro to repeat until it hits the last record and then stop execution. To do this, you might create a dummy record with the item number 000 and add it to the end of the document. Instruct the macro to check each record's item number, continuing formatting if it isn't 000 and stopping if it is.

You also use conditional branching if the different sections of the text you're formatting are of variable lengths. In Example 1, for instance, the product description is always one sentence long. If the description were sometimes *more* than one sentence, however, conditional branching would let your macro test for the appearance of the dollar sign as a signal to move to the next formatting sequence.

Multistep Tasks. If you frequently write letters, you can build a macro that starts by creating a new document, resets the document margins to correctly match your stationery, enters and formats the current date, adds your standard closing, and positions your cursor so you can type the body text.

Your macro might also open your address-book utility, execute the Find command, wait while you enter the name of the

Example 1: Writing a Text-Formatting Macro

To get from this:

0988 DecafMaker. This dream machine has everything the early-rising former caffeine addict needs, including a heat-resistant stir stick. \$98.72

0983 Ginsu+. The grandfather of all sharp-knife sets, perfect for hard-to-open soda cans or in-home pet surgery. \$28.32

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To this:

0988 **DecafMaker.** This dream machine has everything the early-rising former caffeine addict needs, including a heat-resistant stir stick. \$98.72

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person you're writing to, execute the find, copy the person's full name and address, return to your word processor, and paste the name and address in the correct position. Another macro can then grab the address from the top of the letter, create a new document with the correct page setup to print an envelope, and start envelope printing.

Telecommunications. Before the days of custom front-end applications such as AppleLink, CompuServe Information Manager (CIM), and America Online, the first macro most people created was one that dialed their on-line service's local access number and entered their account number and password. Even though logging on is a much simpler matter these days, you still might want a macro that will log on to your service and download your waiting mail.

With CIM or America Online, the tricky part of this macro is that the presence of mail is indicated by an icon that appears only if mail is waiting — so you need a macro that first checks to see if any mail exists and then either reads the mail or immediately logs off. Tempo II Plus lets you handle this situation with a nifty external called BitMatch, which actually

looks at a specific area on-screen and checks to see if that area matches a predefined picture. Using conditional branching, the macro can then either collect the waiting mail and log off or, if the icon's not there, simply log off.

Linking Programs. If you use a fax modem, you probably forget to turn off the fax software before using your other telecom programs, or if you do turn it off, you then forget to turn it back on. You can avoid these problems by building one macro that automatically turns off the fax software as it launches your telecom program and another that turns it back on again when you quit the telecom software.

Better Batch Processing

Once you're comfortable writing more-elaborate macros, you can experiment with macros that let your Mac do *batch processing* — that is, automatically carry out a series of tasks while you're not around. One good use for batch processing is in the field of image manipulation, which can be fairly slow, even on a fast Macintosh. If you know in advance how you want to manipulate each image, it's not that hard to create a batch-processing macro. For example, say that you regularly apply

different Photoshop filters to groups of TIFF images and would like your Mac to apply these filters automatically. To show you how such a macro would be written, I've created a Tempo II Plus macro that automates this process. All you have to do is drag the images you want to manipulate into a folder, add the first few letters of the name of the filter you want to apply to the start of each filename, and then execute all the manipulations with a single keystroke. The macro (MACRO.CPT) is available on Zmac, MacUser's on-line service, in Library 9 (Source Code) of the Download & Support Forum.


Even if you never use Photoshop filters, this macro is interesting to look at in terms of writing batch-processing macros. Here are the macro's elements and how they combine to automate the task:

Filter Macro. You need to write one filter macro for each filter you want to use automatically. Each macro should select *all* of the current image, apply the appropriate filter, save, and then close the file.

Starter Macro. This macro launches Photoshop and selects the first file in a specified folder. Tempo II Plus' SetPath external is used to select the correct folder, and pressing the space bar then selects the top file. After running, this macro branches to the Apply macro.

Apply Macro. This macro grabs the name of the open file from its window; decides which filter to apply, based on the first characters in the file's name; and then branches to the correct Filter macro to apply that filter. First, however, the filename is compared against a variable that holds the name of the previous file — if they're the same, the macro quits immediately. If they're not the same, the macro moves the current filename to the variable holding the names of previous files and continues.

Next, Tempo II Plus uses an IF/THEN statement to check the first letters of the filename and then branches to the correct Filter macro. After Tempo returns from the Filter macro, the next file in the dialog box is selected and opened. This macro repeats unconditionally.

These few examples should give you some idea of how flexible macro-making programs can be. Take a good look at how you work and what you do, and see how your macro program can help boost your productivity. 

Craig Danuloff is the author of *The System 7 Book* and *Encyclopedia Macintosh*.

Your macro should do this:

Action	Microsoft Word command
Move to start of next paragraph	Command-down arrow
Select next word	Command-Shift-right arrow
Apply 12-point italic Times	Times from Font menu 12 from Font menu Italic from Format menu
Deselect	Right arrow once
Tab	Tab key
Select next word	Command-Shift-right arrow
Apply 12-point bold Times	Times from Font menu 12 from Font menu Bold from Format menu
Move forward two words	Command-right arrow twice
Select next sentence	Command-Shift-keypad 1
Apply 12-point Times	Times from Font menu 12 from Font menu
Move forward two words	Command-right arrow twice
Select next character	Shift-right arrow
Apply 10-point Times	Times from Font menu 10 from Font menu
Select next three words	Command-Shift-right arrow three times
Apply 10-point bold Times	Times from Font menu 10 from Font menu Bold from Format menu

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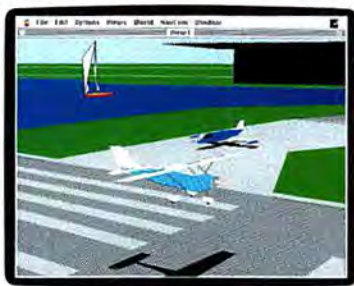
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Compiled by
Gregory Wasson

Excel 3.0

It's a business convention with a column of numbers representing dollar amounts to use the dollar sign (\$) with the first number of a column and in the subtotal and total columns. For all other numbers, Excel's Number option, on the Formats menu, provides a format (#,##0.00) that doesn't include the dollar sign. If you use this format, however, the numbers won't align properly with the cells that have dollar signs (see Figure 1).

To keep the numbers aligned correctly, use the currency number format — (\$,##0.00); (\$,##0.00) — for amounts that require a dollar sign. Edit the currency format by removing the first dollar sign only for amounts that don't require it. The edited version of the currency number format will now appear at the end of the Number option on the Formats menu.

Deb Putnam
Andover, MA

Photoshop

As a photographer, I have often wished that Adobe Photoshop had a more intuitive approach to the conventional photographic processes of *dodging* and *burning*, which lighten and darken parts of an image, respectively. Of course, you can select part of an

image and apply adjustments to it via the Image menu, but this lacks the spontaneity of using an enlarger in a darkroom. Here's how to create burning and dodging tools that mimic the darkroom process:

1. Open a copy of the image you want to alter, and select all (Command-A).
2. Copy the image to the Clipboard.
3. Deselect all.
4. Select the Adjust Brightness/Contrast command from the Image menu (Command-B), and reduce the brightness by 75 percent to create a burning tool; increase the brightness by 75 percent to create a dodging tool. Save the adjusted image in Photoshop format.
5. Paste the copy of the original image from the Clipboard on top of the saved adjusted image. Deselect the image.
6. Double-click on the rubber-stamp tool, and set it to Revert mode at 25-percent opacity. Now when you use the rubber stamp, you can create subtle burning or dodging effects.

Howard Goldbaum
Peoria, IL

System 7

System 7 makes it easy to sort a window's contents by Size, Kind, Label, Date, or Name while you're in the View by Icon mode. To sort

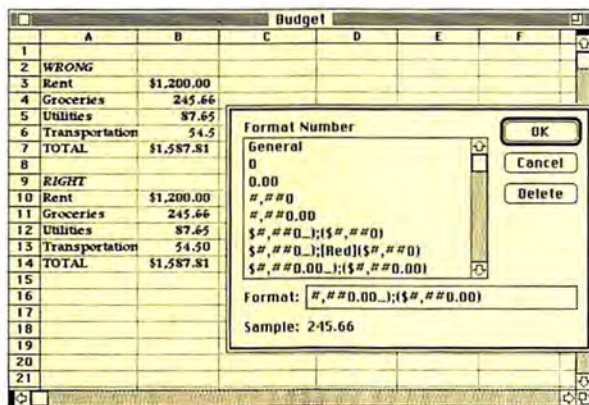


Figure 1: It's a business convention that only the first number in a column of figures should have a dollar sign, but it can be difficult to line up the numbers in subsequent rows (top). The dialog box shows a simple change to Excel's default currency format that makes the figures line up correctly (bottom).

Tip of the Month

System 7

Do you want to protect files, folders, and volumes from prying eyes without using ResEdit or a password-protection program? Here's an easy way to do it that uses System 7's Labels feature. (This tip works only on color and gray-scale monitors.)

Open the Labels control panel, and change one label's color to white (double-click on a label to access the Apple Color Picker). Give the label a new name, or just leave a space where the name should be. Close the Labels control panel.

Next, select the icon of the file or folder you

want to protect, and choose the label you've just modified from the Label menu. Click on the icon to deselect it, and it will disappear. It reappears only when you reselect it.

Finally, change the name of the file you're protecting by typing one or more spaces. This makes the file invisible when it's deselected. You may want to keep all your invisible files in a special folder so you know where to find them.

Lucas C. Wagner
Lisa A. Gould
Avon Lake, OH

a window by Name while in the Icon view, pull down the View menu and select By Name. Return to the Icon view. Hold down the Option key, and select Clean Up by Name from the Special menu. Now your icons are organized alphabetically within the window. The same procedure works for the View by Size, Kind, Label, and Date modes.

Kerry Dorsey
Carmel, IN

System 7 uses true gray to represent dimmed items in menus and dialog boxes instead of using the old black-and-white dithered pattern. Many application menus use this new standard, but most dialog-box items still use the old pattern. If you have ResEdit, you can update your applications to use true gray in

dimmed dialog-box items too.

Open a copy of the application in ResEdit (never work on an original application), and double-click on the DLOG-resource icon. It lists the ID number (and often the name) of all the application's dialog boxes. Find the dialog box you want to alter, and double-click on its ID number. A dialog box that shows a miniature version of the dialog box you want to change appears on the left of the screen, and two buttons (Default and Custom) appear on the right. Click on the Default button, and change one of the colors the dialog box uses by double-clicking on the color and selecting a new color in the resulting Color palette (see Figure 2). I usually change one of the blacks to a dark gray.

When you change the colors, ResEdit asks if you want to

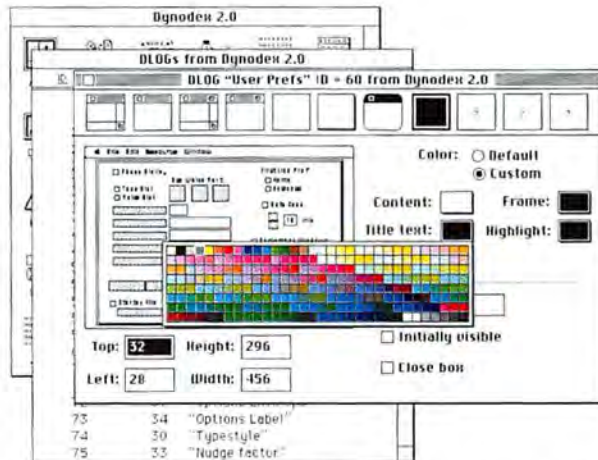


Figure 2: Grayed-out items in menus and dialog boxes under System 7 are true gray, not dithered black-and-white patterns. ResEdit can edit the DLOG resource to give your applications that System 7 look.

create a dctb resource, which is needed to store the color information. Click on OK (if you want to remove the color

and revert to the default, simply delete the dctb resource). Then save your changes, and replace the old application

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FreeHand 3.0

You can use FreeHand's Document Setup dialog box as a quick measurement-conversion calculator. This is handy when your measurement preference is set to picas or points, for example, but you want to know what a document's measurements are in inches.

1. Choose the Document Setup command from the File menu. In the resulting dialog box, enter the point/pica measurements in the custom-page-size entry fields.

2. Change the unit of measure to inches (FreeHand makes the conversion for you automatically), and note the converted measurements.

3. Return the preferences to points or picas, and select Cancel to return to the main drawing window. Use the converted measurements as needed.

If you want to enter a measurement in inches, you can override the point/pica preference by typing *i* immediately after the number (8.5*i* for 8.5 inches, for example).

George E. Thompson
Chicago, IL

PageMaker 4.0

With PageMaker 4.0's auto-linking and updating feature, you can create documents automatically. The technique works best for highly structured documents such as brochures or manuals, in which text has a consistent length and placement. Here's how to do it:

1. Create some dummy text files in your word-processing program, and name them Story 1, Story 2, and so on. You can also do this with graphics, naming them Picture 1, Picture 2, and so on.

2. Open a new PageMaker document, and turn on the Update Automatically and Alert Before Updating features, by clicking on the Links

Options button in the Links dialog box (Command-=), which you access from the File menu. Now place (Command-D) each of the dummy stories and graphics you've created. Choose Save, and click on the Template button in the Save dialog box before you save the file. Then quit PageMaker.

3. When you're ready to create a new self-creating document based on the template, open the dummy text and graphics files in your word-processing or graphics program and delete everything there. Type in the new material, and save the files with the same names (Story 1, Picture 1, and so on) and in the same location.

4. Double-click on the PageMaker template file. A new untitled document based on the template will open, and you'll be asked if you want to update the linked dummy files. Click on OK, and the new text and graphics will appear in the template.

Roy Lee DeWitt
Marietta, GA

4th Dimension 2.x

When you add a procedure to a 4D run-time-menu item that invokes the Quit 4D command, you return to the Finder after choosing that menu item. If your 4D application starts in run-time mode, however, it may not be apparent how to get back to user mode quickly. If you dig through the manuals, you can discover that pressing Option-F takes you out of run-time mode without your having to quit 4D, but if you can't remember that, try this:

Add a new menu command such as Quit to user mode or expanded menus that calls no procedure. When you choose this menu command, the program simply reverts to user mode, which lets you have access to all of 4D's commands and design tools.

Henning Steinbrinker
Karlsruhe, Germany

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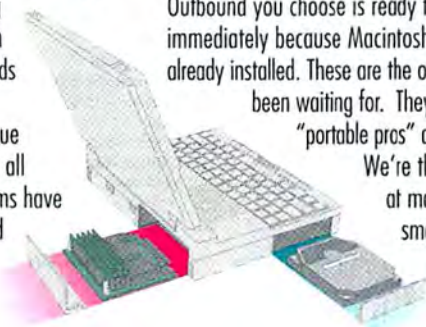
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**By Bob LeVitus and
Andy Ihnatko**

Andy: We start the new year with a correction. In the September '91 Help Folder (page 280), I said that Jon Wind's nifty text-file-transmogrifying program, Add/Strip, was freeware. It ain't—it's shareware. So if you've been using and enjoying Add/Strip all this time, for heaven's sake, send the quite reasonable shareware fee of \$25 to Jon Wind, 2374 Hillwood Drive, Maplewood, MN 55119.

Sorry about that, Jon. Frankly, I blame society.

(A)voiding the Warranty

Q. I want to expand the memory of my Mac Classic from 2 megs to 4, but I don't want to get within three feet of the case for fear of voiding my Apple warranty. The warranty states: "This warranty does not apply . . . if the product has been modified without the written permission of Apple." *Macintosh Reference* says, "Modification or expansion by anyone except qualified personnel voids the equipment's warranty and could cause damage."

Who does Apple consider to be "qualified personnel," and what can I do myself without incurring the wrath of the warranty police?

Therest Ofus
San Diego, CA

Andy: One observation: When a reader is intimidated enough by the company to use an assumed name when writing a letter like this, it's safe to assume that the honeymoon is over and that Apple Computer has officially joined the ranks of the industrial bourgeoisie.

OK, official party dogma first. Your Apple warranty is absolutely and irreversibly revoked the instant your Classic's case is opened

by anyone other than authorized Apple service technicians (known as "qualified personnel" only by their closest friends). So if you so much as open up your Classic just to read those inspiring words ("Made in Singapore") inscribed inside the case, your warranty is dead. In each machine's manual, Apple lists the "upgrades" you're *allowed* to perform yourself—you can go hog-wild installing NuBus cards in your Mac II for instance. Call the Apple Customer Assistance Center at (800) 776-2333 if you have any questions (outside the U.S., call your local Apple dealer).

However, the official party line don't mean diddly in the real world. As long as you leave no evidence behind, your warranty is bullet-proof. This means you should do nothing that "qualified personnel" wouldn't do, so don't solder in new connections; cut leads or traces (wires); or apply a foreign substance such as lacquer, glue, or labels. The rule of thumb: If it's possible to uninstall the upgrade without leaving behind any evidence, you're golden. In other words, if you know what you're doing, go ahead and install that extra memory.

Also, the presence of a third-party upgrade (such as a non-Apple memory card or an expansion card) doesn't necessarily void the warranty; almost all such upgrades are designed according to Apple guidelines and don't pose a threat to your Mac's health or warranty.

So now you're wondering about oddball upgrades such as a 68030 upgrade for a Mac Plus, which involves soldering in a new board. These are decidedly *not* kosher and are righteous *only* if the firm furnishing them is an official Apple VAR (value-added reseller) with

***... But Were Afraid to Ask**

In this enlightened age, we're all trying to help our planet in any way we can. Help Folder's contribution? To set aside regular space for ecologically friendly, easy-to-answer questions for which we waste no fossil fuels and release no ozone-threatening automotive emissions as we would in tracking down the answer to a tricky, complex question.

So please, send in those simple questions. If not for you, if not for us, then for our *children's* sake.

To prevent your identity from falling into the hands of the ecoterrorists, we'll say that your question was sent in by a key event in the life of Charlemagne.

Q. I've just successfully upgraded the RAM of my Mac SE from 1 megabyte to 4, and now I have four 256K SIMMs left over. What's the best thing to do with them? Should I sell them?

Annexation of Bavaria
A.D. 788

Andy: Sad to say, there's practically no market for used 256K SIMMs. As a matter of fact, I seem to remember that some guy on a local bulletin board was trying for months to sell off his four SIMMs for three bucks each, with absolutely no takers.

But hang on to them; they're quite valuable as backup hardware. Someday one of your fancy-pants 1-megabyte SIMMs may blow out on you, and if you've saved your old SIMMs, you'll still be able to struggle on with 2.5 megabytes of RAM by replacing the bad SIMM (and its partner) with the old, forgotten veterans.

They're also useful in implementing juvenile office pranks. Why not replace the 1-megabyte modules in an obnoxious colleague's IIci with low-capacity SIMMs? You can then try to convince him that it's the high overhead of System 7 that's robbed his system of 6 megabytes of memory and see how long he uses System 4.2 before catching on.

proper Apple certification. Ask *before* you buy. It's important.

Finally, all the preceding is true assuming that you manage to pull off the upgrade successfully. If not, and your Mac starts barfing smoke through the floppy-disk slot, Apple will not fix your machine. The following idea may seem sneaky (not that it hasn't been suggested before in this column), but it was corroborated and, depending on the circumstances, *suggested* by every service technician I contacted about this question: If you keep your trap shut and you left no physical evidence of your crime (Twinkie droppings on the motherboard, say), chances are excellent that your involvement in the tragedy will go undetected and your warranty will still be valid.

Bob: If your conscience is

bothered by Andy's suggestions, spend a few extra bucks and have your upgrade installed by "qualified personnel."

Andy: Sure, as America's most beloved Macintosh author, *you* can afford to pay a \$75 minimum bench fee for a memory upgrade that takes 15 minutes to perform. My point is that many upgrades (such as installing extra RAM or an expansion card) are simple. *None* of the nine Apple-authorized technicians I called would have voided the warranty if they'd discovered such unauthorized upgrades — again assuming that you hadn't destroyed your computer in the process!

Untangling the Font Mess

Q. This font business is driving me crazy. I spend most of my time on the Mac writing

and editing, and now that the hardware (an SE/30 with 2 megabytes of RAM and a LaserWriter) is finally paid for, I wouldn't mind expanding my font library. Should I install System 7 and use Apple's TrueType fonts, or should I install Adobe Type Manager and start a PostScript collection? Font technology seems to be completely in flux; is there any simple bottom line to expanding a font collection?

By the way, is there another version of Courier that looks a little less scrawny than the standard Mac version?

T. J. Spath
Los Angeles, CA

Bob: There do seem to be a lot of confusing font options, but fortunately, things are looking up. Apple recently announced an agreement with Adobe Systems that calls for

the inclusion of Adobe Type 1 font technology within a future version of System 7. Apple and Adobe are developing software that supports the Type 1 rasterizer and Type 1 fonts within the Mac's system software. And while that is happening, Mac users can get ahold of ATM and four faces of Adobe Garamond for the special price of \$7.50 by calling Adobe at (800) 521-1976, ext. 4400 (or ask your local Apple dealer). If you want the full ATM package, which includes the Times, Courier, and Helvetica fonts, you'll have to buy the standard ATM package, which costs \$99.

Because Apple will continue to support the TrueType font format, there will be little or no difference between TrueType and PostScript fonts, at least from a user's perspective.

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You'll install a font — TrueType or PostScript Type 1 — which will look beautiful on-screen *and* will print at the highest resolution your printer supports.

One suggestion: Before you install System 7, add some memory — at least 2 more megabytes. Running System 7 with only 2 megabytes of RAM is a lot like trying to run MultiFinder under System 6 with only 1 megabyte of RAM.

As far as the scrawniness of Courier goes, I'm with you. I use Adobe's American Typewriter instead (see Figure 1). I think it's much better looking than Courier.

PageMaker Problems

Q. I have a Mac SE with 2.5 megabytes of RAM that I use for DTP work. I have a couple

of questions I hope you can help me with.

1. When I'm working with scanned graphics in PageMaker, the graphics print fine at first. Then, for no apparent reason, they lose quality. What causes this, and what can I do about it?

2. When I try to print on legal-sized paper, the image is cut off all the way around at about one inch instead of the usual quarter inch. Why is this happening, and is there any way I can fix it?

Martha R. Ward
Sulphur, LA

Bob: There are two things that could be affecting your graphics. First, PageMaker gives you the option of not storing large TIFF files inside the publication (assuming that you save your scans as TIFFs). When you place TIFFs larger

This is Courier 12 point
The Quick Brown Fox Jumped Over

This is American Typewriter 12
The Quick Brown Fox Jumped Over

This is Courier 14 point
The Quick Brown Fox Jumped

This is American Typewriter
The Quick Brown Fox Jumped

Figure 1: If you're looking for a typewriter-style font, you'll find Adobe's American Typewriter font much more substantial than Apple's wimpy Courier.

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than 256K in a document, you receive an alert that asks if you want to include the complete copy in the publication. If you say no, PageMaker creates a link to the original TIFF file and stores a low-res version of the graphic in the publication. As long as you don't move, rename, or delete the original TIFF file, everything will print fine. If you *do* move, delete, or rename the original TIFF file, PageMaker won't be able to find it when you print your publication and will substitute the low-res version.

The other possibility is that you've resized the graphic without using PageMaker's magic resizing feature, which guarantees that the graphic will print as clearly as it can on the printer you've selected. To use magic resizing, you must first select the appropriate printer

(LaserWriter IIITX, or whatever) in the Print dialog box. Once this is done, you magically resize by holding down the Command key before you click and drag a graphic's handles. To magically resize while retaining the graphic's proportions, hold down the Command *and* the Shift keys simultaneously when you drag any handle.

To solve your printing problem when using legal-sized paper, try this: Hold down the Option key, and choose Print from the File menu. This brings up the PageMaker Print Options dialog box. Click on OK. The standard Macintosh Print dialog box will appear. Click on the Options button, and then select Larger Page Area. Click on OK in the Options dialog box. Click on OK in the Print dialog box.

Judging a Mac by Its Product Code

Q. Isn't an upgraded Macintosh 512 equal to a Plus? I just bought an application that doesn't recognize my fully upgraded 512 (complete with new ROM, drive, and 2 megabytes of memory), claiming that it doesn't recognize anything less than a Plus.

Bill Seeley
Clarkdale, AZ

Andy: Bill, you're the victim of prejudice and mindless bureaucracy. There are a lot of different ways for an application to figure out what kind of machine it's running on. The really cloth-eared way is to get the machine's product code, which says that it's a Mac 512, a Mac Plus, a IIx, a Quadra, or whatever. These codes are unaffected by a hardware upgrade unless it's an upgrade from one

model to another. The application you're using probably sees a Mac 512 product code, determines that it doesn't want to associate with such lowly machines, and smacks you in the head.

Studier applications actually check to see what kind of ROMs are present and how much memory is available. These apps will run on a Mac made by Wham-O as long as it has the appropriate hardware.

The Thin Black Line

Q. My Apple 13-inch high-resolution RGB monitor has a dark thin line that runs horizontally across the screen approximately two inches from the bottom. I asked my dealer about this, and he told me that it was a problem in the shielding of the wire that connects the CRT's yoke. When I asked

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if it could be fixed, he said no.

I paid \$750 for this monitor, and I feel a little ripped off, because I believe that this problem can be fixed.

Jeff Ewy

Brooklyn, NY

Bob: You're dealing with a design flaw in the Sony tube, and nothing can be done about it. According to a technical note on AppleLink (Apple's on-line service), Sony's design for this monitor's tube causes a single thin black horizontal line to appear one-third of the way up from the bottom of the screen. It's caused by the horizontal stabilizing wire for the color-mask grid (the grid is a set of vertical wires that blocks the electron beam from hitting color phosphors other than the intended one). This is inherent in the monitor technology, which, according to Apple

Computer, is the best there is.

Despite this flaw, the Apple monitor is one of the best I have seen. How pronounced the black line is varies among monitors. On mine, you can hardly see it at a normal viewing distance; on others, it appears much bigger and darker. If the line on your monitor is annoying, see if your dealer will swap the unit for one with a less visible line.

Sticktion Affliction

Q. My hard drive has a problem that has been identified as "sticktion." What causes this, and how can I repair it?

Stuart Keen, Jr.

Rome, Italy


Andy: When your hard drive suffers from sticktion, the read/write heads are sticking to the surface of the platters (where your data is stored) inside the

hard drive and the platters can't spin. Some of Apple's Quantum drives were notorious for this, and Apple had to replace the drives' ROMs with ones that kept the heads moving at all times.

A less famous but equally troubling problem is when the read/write arm itself gets stuck—the platters in the drive spin freely, but the arm can't maneuver itself to read in the correct data.

Usually, sticktion rears its ugly head at startup; you turn on the drive and hear nothing but the whir of the fan, and the drive fails to mount. The motors that spin the platters generate almost trivial torque (as they should), so even minor sticking results in platters that just won't turn. Another symptom is that the hard drive boots but the arm subsequently sticks

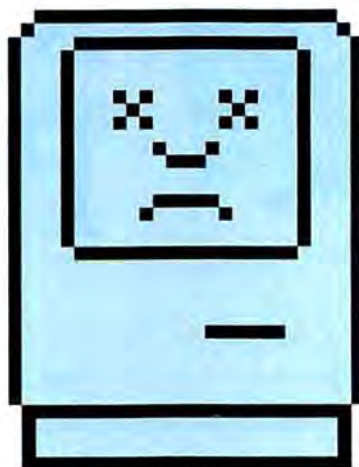
in position and no longer reads or writes files.

I don't know what defect in manufacturing causes sticktion, but it is a *defect* for which the drive manufacturer must be held responsible (assuming that you haven't been monkeying around with the mechanism). Some causes: Improper cleaning of the platters during production, use of a verboten lubricant in the mechanism, or boneheaded hard-drive design. The best fix: Buy a new hard drive, or browbeat the drive manufacturer into replacing the mechanism. If you bought an Apple hard drive (internal or external), call the Apple Customer Assistance line ([800] 776-2333) or your local Apple dealer. Apple's formal recall-and-replacement program ended last October, but it can't hurt to call. 

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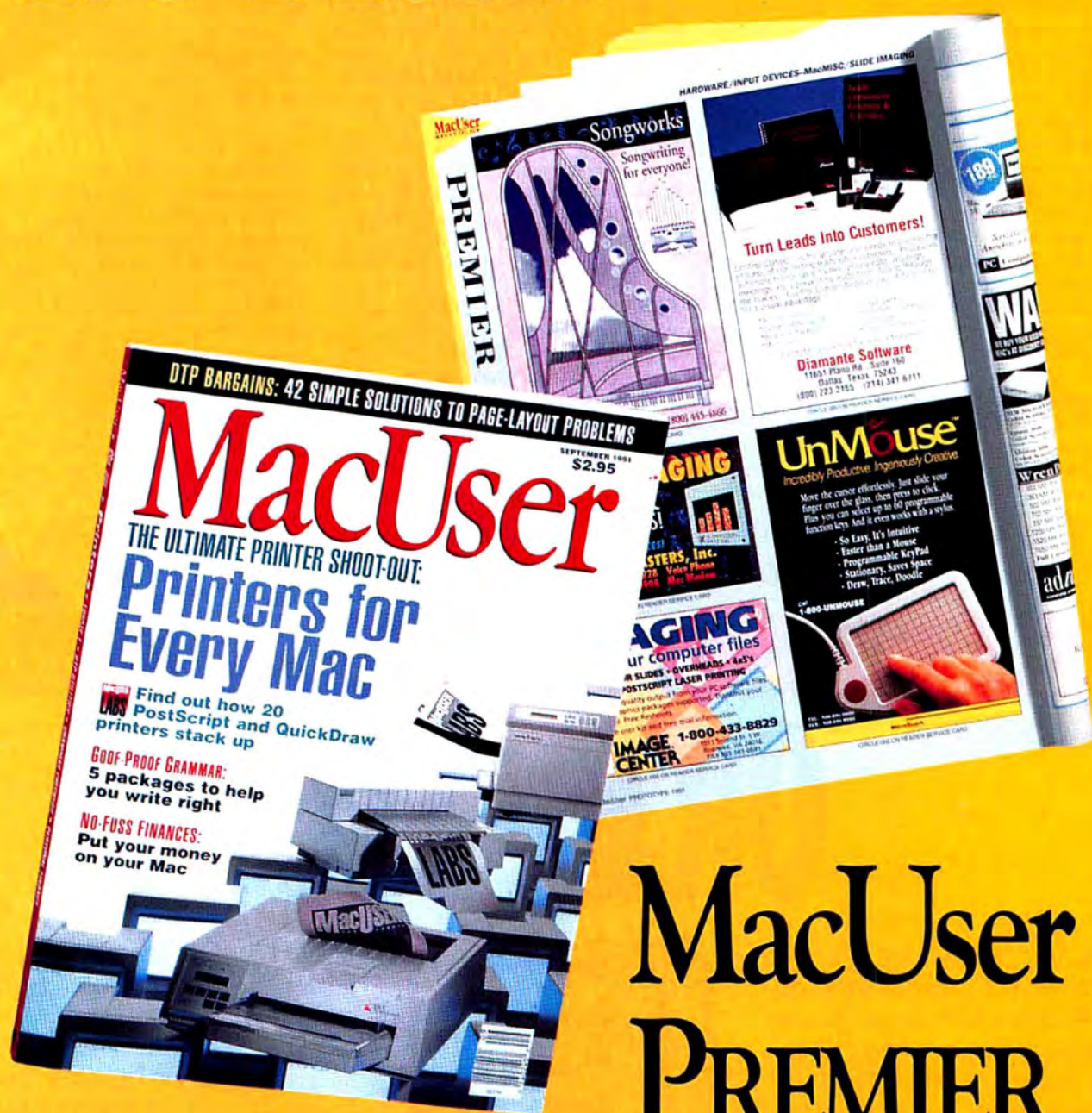
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The original product reviews, along with a HyperCard stack of the entire MiniFinder database, are available on Zmac, our CompuServe on-line service.

Vendor addresses, product prices, hardware specifications, and software features change quickly. To update the MiniFinders database of reviewed products, send written notification to MiniFinders, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

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The Art Importer creates PostScript fonts containing up to 256 graphic characters. Accepts object-oriented PICT and EPS graphics. As fonts, graphics can be used in programs that don't normally accept them, and resizing is as easy as changing the point size. Supports color art. Math-coprocessor version available. Version 2.0 reviewed. Requires Mac Plus or later and System 5.0 or later. \$149; version for Macs with a math coprocessor. \$159. Altsys Corp., 269 W. Renner Rd., Richardson, TX 75080. (214) 680-2060. (Apr '90)

Cheshire

Cheshire is an INIT that lets you copy and paste tab-delimited data into simple charts, which can be placed in a document. Many chart types are possible, typeface styles can be varied, and the charts can be modified. The only programs from which this handy utility can extract data are MacWrite II, Word, MacDraw II, and PageMaker. Version 1.0 reviewed. \$125. Abbott Systems, 62 Mountain Rd., Pleasantville, NY 10570. (800) 552-9157 or (914) 747-4171. (Feb '91)

PrePrint

Intended as a sophisticated color-separation printing utility for PageMaker documents, PrePrint

is similar in general function to Adobe Separator. PrePrint handles color TIFF and EPS files with few problems. Results can be unpredictable with PICT images. Version 1.0 reviewed. Version 1.5 shipping. \$495; upgrade, \$30. Aldus Corp., 411 First Ave. S., Seattle, WA 98104. (800) 333-2538 or (206) 628-2320. (Jan '91)

Fonts & Typography

ATM (Adobe Type Manager)

Adobe Type Manager creates smooth screen fonts at any type size and dramatically improves output on QuickDraw printers such as Apple's ImageWriter II. Not quite perfect (has some problems with Microsoft Word and smaller point sizes) and has slow performance on 68000-based Macs. Version 1.01 reviewed. Version 2.0 shipping. Requires Mac Plus or later and System 6.0.3 or later. \$99. Adobe Systems, 1585 Charleston Rd., P.O. Box 7900, Mountain View, CA 94039. (800) 344-8335 or (415) 961-4400. (Feb '90) ★ '89 Eddy.

Evolution

Evolution is an easy-to-use conversion utility for translating fonts among Type 1, Type 3, and EPS formats. Doesn't produce AFM (Adobe Font Metrics) files, and fonts are unhinted. Sensitivity controls help with difficult conversions. Version 1.02 reviewed. Version 2.0 shipping. Requires Mac Plus or later, System 6.0.4 or later, and a hard-disk drive. \$99. Image Club Graphics, Inc., 1902 Eleventh St. S.E., Ste. 5, Calgary, Alberta T2G 3G2, Canada. (800) 661-9410 or (403) 262-8008. (May '91)

Fontina

Fontina is a font-control program that shows all your fonts simultaneously. No scrolling is required. Correctly organizes font families. Can show fonts in any face and size. The INIT is trouble-free with excellent performance. Version 1.0 reviewed. Requires Mac Plus or later. \$69.95. Eastgate Systems, P.O. Box 1307, Cambridge, MA 02238. (800) 562-1638 or (617) 924-9044. (Sept '90)

FontMonger

FontMonger is a robust font-alteration tool that can convert fonts among PostScript Type 1, Type 3, and TrueType formats. Alterations include small caps; inferior, superior, and slanted characters; and fractions and other composite characters. Characters from different fonts can be combined into a single font, and EPS images can be imported as characters. Alter-

ation interface is excellent, but conversion dialog boxes are often confusing. Can export character shapes as EPS or PICT outlines; PICT images are frequently unusable. Very incomplete manual. Version 1.0.3 reviewed. Requires System 6.0.3 or later and at least 2 MB of RAM; hard-disk drive recommended. \$99.95. Ares Software, P.O. Box 4667, 561 Pilgrim Dr., Ste. D, Foster City, CA 94404. (415) 578-9090. (Nov '91)

Fontographer

Fontographer features an integrated screen-font editor, auto-tracing, a pen tool, and automatic hinting. Can create PostScript and TrueType fonts, but screen-font editor is strictly bare bones. Can also be used for creating logos but should have better drawing tools for this purpose. Version 3.0 reviewed. Version 3.3 shipping. Requires Mac Plus or later and System 5.0 or later. \$495. Altsys Corp., 269 W. Renner Rd., Richardson, TX 75080. (214) 680-2060. (Jan '90)

FontSizer II

FontSizer II creates high-quality screen fonts of any downloadable PostScript typeface in sizes up to 96 points. Excellent utility for producing large font sizes with true WYSIWYG. Version 1.7 reviewed. Version 2.0 shipping. Requires Mac Plus or later, System 5.1 or later, and a PostScript printer. \$99.95. U.S. MicroLabs, Inc., 1611 Headway Cir., Bldg. 3, Austin, TX 78754. (800) 622-2177 or (512) 339-0001. (Apr '89)

FontStudio

FontStudio provides a fully integrated environment for typography on the Mac. If you want a font-production system, FontStudio might be irresistible, because of its ability to store character parts in a library, its excellent bit-map editor, and its strong kerning-pairs interface. Biggest failing is lack of automated hinting. Version 1.0 reviewed. Version 2.0 shipping. Requires Mac Plus or later and a hard-disk drive. \$595. Letraset USA, Inc., 40 Eisenhower Dr., Paramus, NJ 07653. (800) 343-8973 or (201) 845-6100. (Sept '90)

Formulator

Formulator is a mathematical application that incorporates a rudimentary word processor as well as an equation writer. It comes with a helpful HyperCard demonstration stack, and the section on importing equations into a word-processing program is very clear. Version 1.1 reviewed. Requires Mac Plus or later. \$99.95. ICOM Simulations, Inc., 648 S. Wheeling Rd., Wheeling, IL 60090. (708) 520-4440. (July '90)

MICE RATINGS	★	★½	★★	★★½	★★★	★★★½	★★★★	★★★★½	★★★★★
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MINIFINDERS

Hermes & Tribune Fonts

★★★★

Hermes & Tribune Fonts are specially designed fonts that come in sizes up to 120 points. Optimized for the ImageWriter I.Q., the LaserWriter IISC, and fax modems, these fonts look better than Apple's fonts and can replace Helvetica and Times. Requires a non-PostScript high-resolution printer. \$49.95. Miles & Miles, 704 N. Water #1, Ellensburg, WA 98926. (509) 925-5280. (Sept '89)

KernEdit

★★★★

KernEdit is a basic kerning program with a rather un-Mac-like interface. Word View is a nice feature that greatly simplifies kerning-table creation. Maximum resolution is 1/1,000 em. There are 19 kerning-table packages, each containing 25 tables. Version 1.06 reviewed. Version 1.08 shipping. Requires Mac Plus or later. \$149; additional kerning-table packages, \$95 each. Pairs Software, Inc., 160 Vanderhoof Ave., Ste. 201, Toronto, Ontario M4G 4B8, Canada. (416) 467-8784. (Apr '90)

KeyCap Fonts

★★★★

KeyCap Fonts contains three typefaces designed specifically for writing computer documentation. Version 1.0 reviewed. Version 1.1 shipping. \$149.95. Paperback Software International, 2830 Ninth St., Berkeley, CA 94710. (800) 255-3242 or (510) 644-2116. (June '89)

LetraStudio

★★★★

LetraStudio is a type-customization program for creating headlines, logos, signs, and other display type. Lets you create unique distortion effects. Works with LetraFont typefaces or Type 1 fonts. Version 1.0 reviewed. Version 2.0 shipping. Requires Mac Plus or later and a hard-disk drive. \$495; LetraFont typefaces, \$75 each. Letraset USA, Inc., 40 Eisenhower Dr., Paramus, NJ 07653. (800) 343-8973 or (201) 845-6100. (May '89) ★ '88 Eddy

Letterforms and Illusions

★★★★

Letterforms and Illusions is a set of fonts and figures that leads you into exciting typographic explorations. Includes a limited version of MacPaint. Requires Mac Plus or later. \$39.95. W. H. Freeman & Co., 41 Madison Ave., New York, NY 10010. (212) 576-9400. (Mar '90)

MacTography Type Sampler and Type Listing

★★★★

The MacTography Type Sampler and Type Listing combination is a classic art director's type book that has samples of all PostScript laser fonts. The material is searchable on-disk, but screen-resolution is poor. The printed version of Type Sampler is the more valuable part of this pack-

age. Requires Mac Plus or later; Type Listing requires Microsoft Works. \$75; one year of printed updates, \$80. MacTography, 326-D N. Stonestreet Ave., Rockville, MD 20850. (301) 424-3942. (Apr '90)

MasterJuggler

★★★★

MasterJuggler is a Font/DA juggler loaded with features, including constant access to hundreds of fonts, DAs, Fkeys, and sounds. An excellent utility. Version 1.0 reviewed. Version 1.57 shipping. Requires System 6.0.3 or later. \$49. ALSoft, Inc., P.O. Box 927, Spring, TX 77383. (713) 353-4090. (Mar '89)

Metamorphosis Professional

★★★★

Metamorphosis Professional is a utility that converts fonts among PostScript Type 1, Type 3, and TrueType formats on the Mac. Can also produce PostScript fonts for the PC and NeXT platforms. TrueType fonts for the PC, and Fontographer databases. Can access PostScript fonts located in printer ROM and save them on your hard disk. Also can export EPS and PICT outlines of font characters. Elegant interface is powerful yet flexible. Can't create bit maps for TrueType-to-Type-1 conversions and can't convert Adobe Expert series. Version 2.01 reviewed. Version 2.03 shipping. Requires Mac Plus or later and System 6.02 or later; hard-disk drive recommended. \$149. Altsys Corp., 269 W. Renner Rd., Richardson, TX 75080. (214) 680-2060. (Nov '91)

Publishing Packs

★★★★

Publishing Packs bundles three Adobe typefaces that work well together for specific publishing projects. The packages offer substantial savings over purchasing the typefaces individually, and the documentation has useful information on typeface characteristics. Requires Mac Plus or later. Publishing Pack 1 (Newsletters), \$395; Publishing Pack 2 (Forms and Schedules), \$475; Publishing Pack 3 (Presentations), \$475. Adobe Systems, 1585 Charleston Rd., P.O. Box 7900, Mountain View, CA 94039. (800) 344-8335 or (415) 961-4400. (Feb '89)

SPECTacular

★★★★

SPECTacular is a flexible type-sampler program that prints a variety of handsome specimen sheets. Shows typefaces in one- and two-page layouts. Incomplete documentation. Version 1.1.6 reviewed. Version 1.2 shipping. \$79.95. Omega Systems, P.O. Box 7633, Chico, CA 95927. (916) 894-6351. (Dec '91)

Suitcase II

★★★★

Suitcase II has file-management capabilities that let you open 99 fonts, DA, sound, or Fkey files at a time. Can display any installed font in any style. Fonts can also

appear in their proper typefaces on the font menus. Includes Font Harmony for resolving font-ID conflicts, and Font & Sound Valet for font and sound compression. Version 1.2.2 reviewed. Version 2.0 shipping. Requires Mac 512Ke or later and System 4.1 or later. \$79. Fifth Generation Systems, 10049 N. Reiger Rd., Baton Rouge, LA 70809. (800) 873-4384 or (504) 291-7221. (June '89) ★ '87 Eddy

theTypeBook

★★★★

This simple type-sampler program includes four layouts: a specimen page, a key-caps table, a complete character set, and line showings. The latter prints a two-line sample of each selected font. Provides a fast, easy way to compare installed fonts. No frills but offers lots of information about fonts and typography. Good support. Version 2.2 reviewed. Free via on-line services such as Zmac/CompuServe; customized version, \$45. Golden State Graphics (Jim Lewis), 2137 Candis Ave., Santa Ana, CA 92706. (714) 542-5518. (Dec '91)

TypeAlign

★★★★

TypeAlign is an INIT/DA utility that is helpful for DTP work if you use Adobe Type Manager. TypeAlign lets you quickly place text along circular, angled, or arbitrary paths. The program could use the Clipboard better, but the simple effects are easy to control, and the results are striking. Version 1.0.2 reviewed. Version 1.0.4 shipping. Requires Mac Plus or later, System 6.0.3 or later, ATM, and a hard-disk drive. \$99. Adobe Systems, 1585 Charleston Rd., P.O. Box 7900, Mountain View, CA 94039. (800) 344-8335 or (415) 961-4400. (May '90) ★ '89 Eddy

TypeChart

★★★★

This type-sampler program includes five well-designed pages containing useful typographic information. Overview page shows sample headline, standard and composite characters, sample paragraphs, and examples of type-style variations. Headline page shows a font in sizes from 16 to 127 points. Text page shows sample paragraphs in point sizes from 5 to 14 points. Allows alteration or replacement of sample text. Provides flexible printing options and excellent technical data about installed fonts. Version 1.5 reviewed. \$99.95. Octavo Productions, 3623 Sunnycrest Dr., Ste. 800, N. Vancouver, British Columbia V7R 3C5 Canada. (604) 987-5270. (Dec '91)

TypeStyler

★★★★

TypeStyler is a type-customization program that lets you manipulate regular type to create display type. It supports 8-bit color and can output files as process-color separations. Its performance

is excellent except on low-end Macs where it might be unacceptably slow. Includes ten fonts. Version 1.0 reviewed. Version 2.0 shipping. Requires Mac Plus or later. \$219.95. Brøderbund Software, Inc., P.O. Box 6125, 500 Redwood Blvd., Novato, CA 94903. (800) 521-6263 or (415) 382-4400. (May '90) ★ '90 Eddy

World Class Fonts!

★★★★

World Class Fonts! are bit-mapped screen fonts that come with three useful utilities, all the Mac the Knife fonts, and a lot more. Eight separate volumes are available. \$89.95 per volume. DUBL-Click Software, Inc., 9316 Deering Ave., Chatsworth, CA 91311. (818) 700-9525. (Oct '86)

World Class Laser Type

★★★★

World Class LaserType is a six-volume collection of PostScript fonts that are an attractive alternative to more expensive fonts. Each volume is on two 800K disks and includes screen fonts and Type 3 PostScript printer fonts. An excellent value. BigCaps version 3.2 and FontCharter version 2.2 reviewed. Requires PostScript printer. \$89.95 per volume. DUBL-Click Software, Inc., 9316 Deering Ave., Chatsworth, CA 91311. (818) 700-9525. (Dec '89)

• PAGE LAYOUT

CopyFlow

★★★★

CopyFlow is a QuarkXPress XTension that allows batch importing or exporting of text and graphic elements. Adds its own menu to QuarkXPress. CopyFlow automates placement after you've completed your revisions. Works well and can be a real time-saver. Version 2.0 reviewed. Version 2.3 shipping. Requires QuarkXPress. \$395. North Atlantic Publishing Systems, 9 Acton Rd., Ste. 13, Chelmsford, MA 01824. (508) 250-8080. (Sept '90)

DataShaper

★★★★

DataShaper is a PageMaker text-import filter that converts tab- or comma-delimited data files into precisely formatted text as they are placed into a page layout. Requires careful planning and time-consuming programming of special code, but saves considerable time compared with preparing imported text manually. Works well for publishing large, frequently updated databases in custom layouts. Allows creation of multiple filters, each with its own name and providing different typography, spacing, punctuation, and inserted text. Automates arrangement of category heads, subheads, invisible placeholders, and graphics. Version 1.2 reviewed. Requires PageMaker 4.0 or later. \$179.95. ElseWare Corp., 3201 Fremont Ave. N., Seattle, WA 98103. (206) 547-9623. (Oct '91)

DesignStudio **★★½**

DesignStudio is based on Ready, Set, Go! but is more than just a beefed-up version of that program. This high-end program has new layout-management features, and its handling of text, graphics, and color separations is good. It duplicates many of Ready, Set, Go!'s drawbacks, however. Performance needs to be improved considerably, and a totally new manual would be helpful. Version 1.0 reviewed. Version 2.0 shipping. Requires Mac SE/30 with a hard-disk drive or Mac II series. \$795; upgrade from Ready, Set, Go!, \$250. Letraset USA, Inc., 40 Eisenhower Dr., Paramus, NJ 07653. (800) 343-8973 or (201) 845-6100. (June '90)

Fast Forms **★★½**

Fast Forms is a modest, inexpensive forms-design program intended primarily for low-end users. Its manual is a joy to read. Imports and exports comma- and tab-delimited files. Can create fields to match scanned images of preexisting forms. The FastForms Filler feature lets you fill out forms without needing the original program. Can't import EPS graphics. Version 2.0 reviewed. \$179.95. Power Up Software Corp., 2929 Campus Dr., San Mateo, CA 94403. (800) 851-2917 or (415) 345-5900. (Sept '90)

FlexForm Business Templates **★★★**

FlexForm Business Templates are two volumes of prepackaged business forms. Includes SmartForm Assistant. Volume I contains stockkeeping, production, sales, billing, and collection forms. Volume II has purchasing, receiving, accounting, disbursing, and personnel business forms. \$89.95 per volume. Formula, Inc., 1160 Industrial Ave., Ste. J, Petaluma, CA 94952. (707) 763-9944. (Jan '90)

FrameMaker **★★★★**

FrameMaker is a powerhouse program for long-document publishing. Provides sophisticated control over paragraph formats and cross-referencing. Its 130,000-word spelling checker works well and quickly. Portable formatting. Imports standard Mac graphics as well as EPSI (UNIX), DOS, EPS, and Sun raster files. Version 2.1 reviewed. Version 3.0 shipping. Requires Mac II series, System 6.0.3 or later, a 40-MB hard-disk drive, 4 MB of RAM, a PostScript printer, and a large-screen monitor. \$795. Frame Technology, 1010 Rincon Cir., San Jose, CA 95131. (408) 433-3311. (Nov '90)

It:X Forms Designer **★★**

This application, from the publisher of MacInTax, takes a highly innovative approach to the electronic design of business forms.

Steep learning curve. The program has good typeface control and many automated functions that speed form creation. However, the lack of support for industry-standard, multipart forms and serious database-management features cripple this application. Version 1.1 reviewed. \$49.95. ChipSoft, Inc., 6330 Nancy Ridge Rd., Ste. 103, San Diego, CA 92121. (619) 453-8722. (Feb '91)

Informed Designer **★★★★**

Informed Designer is a complex and comprehensive forms-design program intended primarily for high-end corporate users. Capable of accuracy to 1/1,152 of a degree. Draws lines from .25-point to 999-point thick. Can import or export almost anything. Can take any object and rotate, replicate, duplicate, or resize it ad infinitum. More than 150 mathematical, financial, and statistical functions. Related program, Informed Manager, is a complete flat-file database manager. Version 1.0.1 reviewed. Version 1.2 shipping. Requires Mac SE or later, System 6.0.5 or later, and a hard-disk drive. \$295; Informed Manager, \$195. Shana Corp., Advanced Technology Center, 9650 20th Ave., Ste. 105, Edmonton, Alberta T6N 1G1, Canada. (403) 463-3330. (Sept '90)

Interleaf Publisher **★★★★**

Interleaf Publisher is a speedy multiuser layout system for producing large, complicated documents. Improved user interface but suffers from poor font management. Planned revision, Interleaf 5, will consist of six products tailored for specific job categories: Interleaf Professional Writer, Interleaf Engineer, Interleaf Illustrator, Interleaf Production, Interleaf Academic, and Interleaf Passport. Version 3.5 reviewed. Version 3.6.2 shipping. Requires Mac II series with 5 MB of RAM and a hard-disk drive. \$995. Interleaf, Inc., Prospect Place, 9 Hillside Ave., Waltham, MA 02154. (800) 456-5323 or (617) 290-0710. (Apr '89)

Layouts **★★★★**

Layouts is a five-disk set of PageMaker templates. The business-document templates are excellent. The superb manual has money-saving printing tips. Versions for QuarkXPress and Ready, Set, Go! are also available. Requires Mac Plus or later and PageMaker. \$129.95 for each version. Postcraft International, Inc., 27811 Ave. Hopkins, Ste. 6, Valencia, CA 91355. (805) 257-1797. (May '90)

Multi-Ad Creator **★★★★**

Multi-Ad Creator is a powerful tool that lets you create high-quality single-page ads. It is easy to use and nearly foolproof (it lacks a good-taste feature). Every kind of graphic file and most word-

processor files can be imported. If you create ads and don't need an all-purpose page-layout program, get Multi-Ad Creator. Version 2.1 reviewed. Version 2.5 shipping. Requires Mac Plus or later with 2 MB of RAM and a hard-disk drive; Mac II series recommended. \$995. Multi-Ad Services, Inc., 1720 W. Detweiller Dr., Peoria, IL 61615. (800) 447-1950 or (309) 692-1530. (June '90)

PageMaker **★★★★**

PageMaker 4.0 is a major upgrade of Aldus' popular page-layout application. It adds 75 new features without complicating the program. The new version's range of improvements is impressive. PageMaker is accessible and significantly improved in its word-processing, typography, graphics, links management, long-document processing, color, and table-processing capabilities. Version 4.0 reviewed. Version 4.2 shipping. Requires Mac Plus or later and a hard-disk drive. \$795; upgrade, \$150. Aldus Corp., 411 First Ave. S., Seattle, WA 98104. (800) 333-2538 or (206) 628-2320. (Sept '90) ★ '85, '87, '88 Eddy

PDQ! (Page Designs Quick!) **★★★★**

PDQ! (Page Designs Quick!) and PDQ! 5 (Page Designs Quick! 5) are PageMaker templates designed exclusively for newsletter and newspaper publishing. The sets contain many layouts: 60 three-column, 60 four-column, and 225 tabloid-sized, five-column. The templates' quality is excellent, but they lack art. You can modify all layouts from within PageMaker. Requires PageMaker 3.0 or later. PDQ!, \$89.95; PDQ! 5, \$159.95. PAR Publishing, 6355 Topanga Canyon Blvd., Ste. 307, Woodland Hills, CA 91367. (818) 340-8165. (Aug '90)

Personal Press **★★★★**

Personal Press is a budget page-layout program. Lots of good features, including basic word processing. Has style-sheet support, good TIFF-half-tone controls, and spot-color cutouts. Auto-Create feature simplifies design and production of templates. Easy to use, yet powerful enough for basic DTP projects. Needs ample memory and disk space. Editing in 100-percent view only. Screen refresh occasionally slow. Can have only one document open at a time. Version 1.0 reviewed. Version 1.01 shipping. Requires Mac Plus or later with 2 MB of RAM, System 6.0.3 or later, and a hard-disk drive. \$299. Aldus Corp., 411 First Ave. S., Seattle, WA 98104. (800) 333-2538 or (206) 628-2320. (July '91)

Publish It! **★★★★**

Publish It! is a page-layout package designed for users with basic DTP requirements. Includes word-

processing and simple drawing and painting tools. Uses a frame metaphor. Can rotate text. Limited color support. Version 1.1 reviewed. Version 1.2 shipping. Requires Mac Plus or later; a hard-disk drive and System 6.0.3 or later recommended. \$495. Time-works, Inc., 625 Academy Dr., Northbrook, IL 60062. (800) 535-9497 or (708) 948-9200. (Dec '89)

Publish It! Easy **★★★★**

Publish It! Easy is a budget DTP application with many features, including a slide-show option, service-bureau checklist, and built-in database. Menus and dialog boxes are uncrowded and simple to use. Easy text and graphic importation. Can't do complex color separations. Has small disk and memory requirements, vertical text justification, and five levels of Undo. Lacks real style sheets. Documents limited to 100 pages. Can't turn off master elements. Version 2.01 reviewed. Version 2.11 shipping. Requires Mac Plus or later and System 6.0.3 or later. \$249.95. Time-works, Inc., 625 Academy Dr., Northbrook, IL 60062. (800) 535-9497 or (708) 948-9200. (July '91) ★ '90 Eddy

QuarkXPress **★★★★**

QuarkXPress 3.0 is a high-end, professional page-layout program that now has a greatly simplified interface. It lets you have as many as 127 different retroactive master pages per document. You can use the space outside the page as a pasteboard. You can also rotate any object or group in increments as fine as .001 degree. As many as seven documents can be open simultaneously. Excellent color controls. Version 3.0 reviewed. Version 3.1 shipping. Requires Mac Plus or later with 2 MB of RAM and a hard-disk drive. \$895. Quark, Inc., 300 S. Jackson, Denver, CO 80209. (800) 788-7835 or (303) 934-2211. (Nov '90) ★ '89 Eddy

RagTime **★★★★**

RagTime combines word-processing, page-layout, graphics, and spreadsheet capabilities. It has a wide array of charts, hyphenation dictionaries in 14 languages, and an integral word processor that can check spelling in 8 languages. Linked spreadsheets within the same or other documents update automatically. Offers 80 functions, and you can add external functions for importing data from SQL databases. It also has page-layout functions such as the ability to flow text around frames and to adjust color and tint. Its number-crunching capabilities are minimal. Version 3.04 reviewed. Version 3.1 shipping. Requires Mac Plus or later with 2 MB of RAM, System 6.0.2 or later, and a hard-disk drive. \$599. RagTime USA, Inc., 702 Marshall St., Ste.

MINIFINDERS

322, Redwood City, CA 94063. (800) 875-9632 or (415) 780-1800. (June '90)

RagTime Classic \$\$\$

RagTime Classic is a budget page-layout program, a simplified version of RagTime. Has a spreadsheet module and control over TIFF halftones. Lacks style sheets or layout rulers. Very limited text-import options: only ASCII, Word 1.0, and MacWrite 5.0. Copy-protection uses key-disk system. Confusing, incomplete documentation but toll-free support. Version 2.1 reviewed. Version 2.1 shipping. Requires Mac Plus or later and System 5.0 or later; a hard-disk drive recommended. \$195. RagTime USA, Inc., 702 Marshall St., Ste. 322, Redwood City, CA 94063. (800) 875-9632 or (415) 780-1800. (July '91)

Ready, Set, Go! \$\$\$

Ready, Set, Go! is a low-budget DTP program. Elegant interface. Good style sheets, typographical controls, gray-scale halftone control, and spot color. Provides thumbnail views of publications. Stores font-name information within documents, which avoids font-ID conflicts. Easy to use. Limited graphic tools. Version 4.5a reviewed. Version 4.5 shipping. Requires Mac Plus or later and a hard-disk drive. \$295. Letraset USA, Inc., 40 Eisenhower Dr., Paramus, NJ 07653. (800) 343-8973 or (201) 845-6100. (July '91) ★ '86 Eddy

SmartForm Designer \$\$\$\$

SmartForm Designer is a full-featured forms-design manager. Includes SmartForm Assistant for filling out forms when design is complete. This easy-to-use design environment can import color graphics. Version 1.1 reviewed. Version 1.1.v1 shipping. Requires Mac Plus or later. \$399. Claris Corp., 5201 Patrick Henry Dr., Santa Clara, CA 95052. (408) 727-8227. (Jan '90)

Springboard Publisher II \$\$\$

Springboard Publisher II is a low-end, very basic, template-based DTP package. Typing window allows simplified text entry. Text and graphics editing only in Actual Size view. Black-and-white painting tools only. Can't color text but includes SmartArt DA. Imports standard word-processing documents. Version 2.0 reviewed. Requires Mac Plus or later. \$199.95. Spinnaker Software Corp., 201 Broadway, Cambridge, MA 02139. (800) 323-8088 or (617) 494-1200. (July '91)

TrueForm \$\$\$\$

TrueForm creates an electronic form by superimposing a layout over a scanned image of an existing paper form or by importing layouts from another design environment. No design capabilities. Automatic field definition. Has form-caching capability for faster

printing. Version 2.0 reviewed. Requires Mac Plus or later and System 6.0.3 or later. \$395. Adobe Systems, 1585 Charleston Rd., P.O. Box 7900, Mountain View, CA 94039. (800) 344-8335 or (415) 961-4400. (Jan '90)

Ventura Publisher Macintosh Edition \$\$\$\$

The Mac version of Ventura Publisher, the venerable PC page-layout program, still feels like a PC product, despite its considerable strength in technical and long-document publishing. Even if you're willing to forgive its clumsy adaptation to the Mac interface, Ventura still has two major problems: First, it leaves all imported text and graphics files separate from the Ventura document, which lets the Ventura document remain compact but requires constant tracking of the other linked files; second, typeface management is unreliable if you need professional results. Version 3.0 reviewed. Version 3.0.1 shipping. Requires at least 3 MB of RAM and at least 4 MB of space on a hard-disk drive. \$795. Ventura Software, 15175 Innovation Dr., San Diego, CA 92128. (800) 822-8221 or (619) 673-0172. (May '91)

PRESENTATIONS

CA-Cricket Presents \$\$\$\$

CA-Cricket Presents is a presentation tool with a strong graphics emphasis. Good master template. Lacks text-import capability. Version 1.0 reviewed. Version 2.1 shipping. Requires Mac Plus or later, System 6.0.3 or later, and a hard-disk drive. \$199. Computer Associates International, Inc., 1240 McKay Dr., San Jose, CA 95131. (800) 531-5236 or (408) 432-1727. (Dec '88)

MORE \$\$\$\$

MORE's outlines can be instantly transformed into presentations. Dozens of templates are provided, and users can also design their own. There is a wide choice of customizable labeling schemes. Slide-making tools are formidable. Version 1.0 reviewed. Version 3.1 shipping. Requires Mac Plus or later, System 6.0.3 or later, and a hard-disk drive. \$395; upgrade for existing users, \$49. Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014. (800) 441-7234 or (408) 253-9600. (Oct '90) ★ '86, '90 Eddy

OverView \$\$\$\$

OverView is a midlevel program that offers fast, flexible design of on-screen presentations at the expense of some high-end features. Works as a DA or as an application. Can create stand-alone applications for distribution of finished presentations. Imports wide variety of text files and color artwork from other programs, but its built-in text and graphic tools

are rudimentary. Extremely limited support for slide makers. Excellent tutorial. Version 2.1 reviewed. Requires color-capable Mac and a hard-disk drive; large-screen monitor recommended. \$159.95. Loop Software, P.O. Box 1249, Menlo Park, CA 94026. (800) 288-7631 or (415) 326-4803. (Sept '91)

Persuasion \$\$\$\$

Persuasion is a powerful, comprehensive desktop-presentation program. Templating and outlining capabilities have been improved considerably since initial release, and slide shows are handled well. Very few flaws. Version 2.0 reviewed. Version 2.1 shipping. Requires Mac Plus or later, System 6.0.3 or later, and a hard-disk drive. \$495; upgrade, \$75. Aldus Corp., 411 First Ave. S., Seattle, WA 98104. (800) 333-2538 or (206) 628-2320. (Apr '90) ★ '88 Eddy

PowerPoint \$\$\$\$

PowerPoint is an easy-to-use desktop-presentation tool. Good color schemes. Can send presentations to GenGraphics to produce color 35mm slides. Version 2.0 reviewed. Version 2.0.1 shipping. Requires Mac Plus or later and System 6.0.3 or later; a hard-disk drive recommended. \$395. Microsoft Corp., One Microsoft Way, Redmond, WA 98052. (800) 426-9400 or (206) 882-8080. (Aug '87) ★ '87 Eddy

VideoQuill \$\$\$

VideoQuill's purpose is to produce high-quality PICT- or TIFF-format type for video or multimedia presentations. Not wholly successful, despite nice effects such as blends and transparencies. Uses fonts only in its own format and can't convert Type 3 or Adobe Type 1 fonts. The Font Pack has 47 fonts to supplement the 2 that are provided, but this option raises the purchase price. Version 1.0.1 reviewed. Requires Mac II series with 32-bit-color QuickDraw, a color display, and 2 MB of RAM. \$695 with Font Pack. Data Translation, 100 Locke Dr., Marlboro, MA 01752. (508) 481-3700. (Feb '91)

GENERAL GRAPHICS

BannerMania \$\$\$\$

BannerMania is a specialty graphics program that lets you print banners, bumper stickers, signs, posters, and T-shirt designs. Includes 19 custom outline fonts that scale and print at any size. Also imports Type 1 fonts. Good use of ImageWriter's limited color capabilities. Offers variety of special effects for text manipulation, including the awesome Transmogrify command. Limited graphics import/export capabilities. Excellent manual. Version 1.0 reviewed. Requires Laser-

Writer or ImageWriter II. \$59.95. Broderbund Software, Inc., P.O. Box 6125, 500 Redwood Blvd., Novato, CA 94903. (800) 521-6263 or (415) 382-4400. (Oct '91)

Capture \$\$\$\$

Capture is a reliable screen-capture utility. It can capture full or partial screens either to the Clipboard or to a PICT file. Supports 8-bit and 32-bit color. Capture may have to be renamed on your Mac to avoid INIT conflicts. Version 2.0 reviewed. Version 4.0 shipping. Requires System 6.0.3 or later. \$129.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. (818) 991-6540. (Jan '90)

ColorStudio \$\$\$\$

Although decidedly more complex and difficult to learn than Adobe's Photoshop, ColorStudio offers an unbeatable set of tools for professional-quality color manipulation and high-end output. For electronic prepress work where scanned photos, computer-generated graphics, or other artwork must look their best, ColorStudio lets you control color calibration, film separations, amazing special effects, and a wide range of image-editing tools. The Shapes Annex package (bundled with ColorStudio) adds an editable PostScript drawing layer. Version 1.11 reviewed. Version 1.5 shipping. \$995. Letraset USA, Inc., 40 Eisenhower Dr., Paramus, NJ 07653. (800) 343-8973 or (201) 845-6100. (May '91) ★ '90 Eddy

Digital Darkroom \$\$\$\$

If you don't need the color capabilities of more-expensive photo-manipulation programs, then Digital Darkroom is for you. Strictly for black-and-white or high-resolution gray-scale images, although images can be colorized for use in other programs. This program does everything required for professional photo layouts. Uncluttered interface and a wide variety of painting and selection tools. Version 2.0 reviewed. Requires Mac Plus or later with at least 4 MB of RAM and a hard-disk drive, or SE/30 or Mac II series with gray-scale or color-video card and monitor required for gray-scale viewing. \$395. Aldus Corp., 411 First Ave. S., Seattle, WA 98104. (800) 333-2538 or (206) 628-2320. (June '91) ★ '88 Eddy

Enhance \$\$\$\$

Enhance is a low-priced 8-bit, gray-scale image processor. Has many of the graphics tools of a first-class photo-retouching program. Blends image processing with high-level graphic-arts tools. Includes painting, text, and shape-drawing tools. Weak manual. Version 1.01 reviewed. \$375. MicroFrontier, 7650 Hickman Rd., Des Moines, IA 50322. (800) 388-8109 or (515) 270-8109. (July '90)

MICE RATINGS \$ \$½ \$\$\$ \$\$\$½ \$\$\$\$ \$\$\$\$½ \$\$\$\$\$ \$\$\$\$\$½ \$\$\$\$\$\$

Flexigraphs ****

Flexigraphs lets you start with basic charts that you can modify in a staggering variety of ways. The simple but elegant interface lets you add attractive details and modify certain parts of charts while locking other areas down. Version 1.0 reviewed. Version 1.5 shipping. Requires Mac Plus or later. \$149. Tree Star, Inc., 116 Memory Ln., Campbell, CA 95008. (800) 366-6045 or (408) 371-8343. (Apr '90)

Image Analyst ****

Image Analyst is an image-processing program that lets you identify and analyze any element of an image. Measurements and statistics can be automatically or interactively generated from TIFF or PICT files or from captured video images. Manual is well illustrated but poorly written. Easy to learn. No programming is necessary. Version 7.1 reviewed. \$2,000. Automatix, 1000 Tech Park Dr., Billerica, MA 01821. (508) 667-7900. (July '90)

Image Grabber ****

Image Grabber is a DA screen-capture program. Can capture pull-down menus and convert 8- and 24-bit-color screens to 2-bit black-and-white files, saving huge amounts of memory. It has real-time and delay modes and captures in MacPaint and PICT formats. Version 2.0 reviewed. Requires Mac Plus or later and System 6.0.3 or later. \$49. Sebastian Software, P.O. Box 70278, Bellevue, WA 98007. (206) 861-0602. (May '90)

ImageStudio ****

ImageStudio puts a complete black-and-white or gray-scale photo-retouching lab on the Mac desktop. Editable brushes let you modify digitized images in 256 gray levels. If you never work on color images, ImageStudio may be all you need for professional photo manipulation. Version 1.0 reviewed. Version 1.7 shipping. Requires Mac Plus or later and a hard-disk drive; gray-scale work requires 8-bit video card and a compatible monitor. \$250. Letra-set USA, Inc., 40 Eisenhower Dr., Paramus, NJ 07653. (800) 343-8973 or (201) 845-6100. (June '88)

Infini-D ****

Infini-D packs modeling, rendering, and animation into an outstanding 3-D-design package. Offers true object metamorphosis, free-form objects, ray tracing, SMPTE time-code animation, and multilayer surfaces. Easy-to-use, well-integrated interface allows multiple views and light sources, plus easy object editing. Sophisticated use of fractals creates realistic, randomly generated terrain. Surface maps can combine color, bump, transparency, reflection, and glow effects. Animations can

be exported to other programs. Good documentation and support. Version 1.0 reviewed. Version 1.1 shipping. Requires color-capable Mac II with 4 MB of RAM, 32-bit QuickDraw, and a hard-disk drive. \$895. Specular International, P.O. Box 888, Amherst, MA 01004. (413) 549-7600. (Oct '91)

LANDesign ****

LANDesign is versatile land-surveying software that simulates the way surveyors worked before they had Mac software to help them. All standard COGO (coordinate geometry) features are supported, and all objects can be named with both character identifiers and labels. This intelligent program is easy to use. Version 1.11 reviewed. Version 1.14 shipping. Requires Mac Plus or later; hard-disk drive recommended. \$595. Compunet, Inc., 113 McCabe Crescent, Thornhill, Ontario L4J 2S6, Canada. (416) 738-4601. (Sept '89)

MacRenderMan ****

MacRenderMan generates photo-realistic color images from files created in 3-D programs and saves in RIB (RenderMan Interface Bytestream) format. Programs supporting RIB format include MacroMind Three-D, StrataVISION 3d, and Swivel 3D Professional. Spools RIB files into a folder and processes in the background under MultiFinder. Supports 32-bit color and renders attributes such as transparency, surface textures, multiple light sources, natural or artificial light, reflected light, shadows, and motion blur. Although it's complex and time-consuming to master, it provides superb high-resolution results. Version 1.1 reviewed. Requires Mac II series with 24-bit-color display, at least 5 MB of RAM, 32-bit QuickDraw, and a hard-disk drive. \$695. Pixar, 1001 W. Cutting Blvd., Richmond, CA 94804. (510) 236-4000. (Aug '91)

Mariah ****

Formerly called PictureBase, Mariah is a powerful graphics librarian. Can store paint- and PICT-formatted items and attach keywords for later search and retrieval. Users of the Curator program from Solutions, Inc., can also upgrade to Mariah. PictureBase version 1.2 reviewed. Mariah version 1.06 shipping. Requires Mac Plus or later and System 6.0.5 or later. \$149; upgrade from PictureBase, \$49; upgrade from Curator, \$69. Symmetry Software Corp., 8603 E. Royal Palm Rd., Ste. 110, Scottsdale, AZ 85258. (800) 624-2485 or (602) 998-9106. (Sept '87) ★ '86 Eddy

ModelShop II ****

ModelShop II is a powerful 3-D modeling package. Extensive feature list includes support for unlimited drawing layers, Bézier-

curve walls, text, precise measurements, shaded rendering, multiple light sources, and animation. Flexible, straightforward interface offers good selection of drawing tools plus easy control of viewpoint and mouse-operated walkthrough. Supports DXF and ClarisCAD file formats. Animation options include creation of stand-alone, self-running demos with sound. Version 1.2 reviewed. Version 1.5 shipping. Requires Mac II series and a hard-disk drive. \$895. MacroMind-Paracomp, Inc., 600 Townsend St., Ste. 310W, San Francisco, CA 94103. (415) 442-0200. (Dec '91)

MultiClip 2.0 ****

MultiClip 2.0 is a much improved version of an already good product. It lets you have as many Clipboards as your hard-disk space allows, which makes many graphics and page-layout applications easier to use. New features simplify finding an image quickly. Version 2.0 reviewed. Requires Mac Plus or later. \$129. Olduvai Corp., 7520 Red Rd., Ste. A, South Miami, FL 33143. (800) 822-0772 or (305) 665-4665. (Oct '90)

PhotoMac ****

PhotoMac is a color-retouching tool for PICT and TIFF photographs. Displays and edits in 8-bit mode; saves in 8- or 24-bit modes. Performs color separations, but process requires substantial disk space. Version 1.0 reviewed. Version 1.5 shipping. Requires Mac II with 2 MB of RAM, a color monitor, 8-bit video card, 32-bit QuickDraw, and a hard-disk drive. \$795. Data Translation, 100 Locke Dr., Marlboro, MA 01752. (508) 481-3700. (July '89) ★ '88 Eddy

Photoshop ****

Photoshop is a professional, 32-bit photo-retouching program that combines powerful image-editing capabilities with an unimposing interface. Fast, reliable, and easy to use. Flexible file-conversion options — can import and export images to and from popular graphics file formats for Mac and DOS machines. Comes with many useful special-effects filters for customizing images. Allows on-screen CMYK editing, precise control of color separations, UCR (undercolor removal), and GCR (gray-component replacement). Can open and rasterize EPS files for incorporation into continuous-tone images. Supports PostScript Level 2. Version 2.0 reviewed. Requires Mac II series with at least 4 MB of RAM, a hard-disk drive (minimum of 150 MB recommended), and a color monitor. \$895. Adobe Systems, 1585 Charleston Rd., P.O. Box 7900, Mountain View, CA 94039. (800) 344-8335 or (415) 961-4400. (Sept '91) ★ '90 Eddy

PictureBook ****

PictureBook is a superb Scrapbook replacement. It catalogs your Scrapbook and lets you resize and/or crop anything that can be copied to the Clipboard. Has a lot of power, and the interface is excellent. Version 3.1 reviewed. Version 3.2a shipping. Requires Mac Plus or later and System 4.1 or later; a hard-disk drive recommended. \$99.95. Loop Software, P.O. Box 1249, Menlo Park, CA 94026. (800) 288-7631 or (415) 326-4803. (Sept '89)

Ray Dream Designer ****

Ray Dream Designer is a midrange 3-D-design program that offers fast ray tracing of 3-D models. Awkward interface and creation of multiple files hinders productivity, but speedy ray-traced renderings show detailed reflective surfaces, shadows, and transparency effects. Good PICT and texture mapping. Useful Preview mode. Resulting 24-bit PICT files are close to photo-realistic. Image-rendering process can run in the background. May not be adequate for modeling of convoluted surfaces or complex objects with exact surface definitions. Version 1.0 reviewed. Version 1.1 shipping. Requires Mac II series with 4 MB of RAM, 32-bit QuickDraw, and a hard-disk drive; coprocessor chip recommended for 68020 Macs. \$895. Ray Dream, Inc., 1804 N. Shoreline Blvd., Mountain View, CA 94043. (415) 960-0765. (Sept '91)

Screenshot ****

Screenshot is a simple, powerful screen-capture utility. Can precisely capture and save selected screen items, without extraneous pixels surrounding captured image. Can convert color images to black-and-white on the fly and can change image size at time of capture. Can leave the Screenshot window open to capture multiple images without repeatedly pressing "hot key." Images can be printed or saved immediately in bit-mapped paint, PICT, 24-bit color, Clipboard or Scrapbook, or StartupScreen formats. Version 1.1 reviewed. \$59.95. Baseline Publishing, 1770 Moriah Woods Blvd., Ste. 14, Memphis, TN 38117. (800) 926-9677 or (901) 682-9676. (Mar '91)

Smart Art ****

Smart Art is a nifty PostScript utility disguised as a DA. It creates special effects with text and graphics, and it lets you import EPS files into any program. Has 15 text effects. Version 1.0.1 reviewed. Version 1.0.2 shipping. Requires Mac Plus or later, System 6.0.3 or later, and a PostScript laser printer. \$149. Adobe Systems, 1585 Charleston Rd., P.O. Box 7900, Mountain View, CA 94039. (800) 344-8335 or (415) 961-4400. (Oct '89)

MINIFINDERS

Smart Art II, III, and IV **☆☆☆☆**
Smart Art II, III, and IV are the second, third, and fourth volumes of Smart Art. Includes an export facility and a much-improved DA that permits direct printing. Volume II includes graphic elements; volumes III and IV contain text effects. Version 1.0.2 reviewed. Requires Mac Plus or later, System 6.0.3 or later, and a PostScript laser printer. \$149 per volume. Adobe Systems, 1585 Charleston Rd., P.O. Box 7900, Mountain View, CA 94039. (800) 344-8335 or (415) 961-4400. (Jan '90)

SmartScrap and The Clipper **☆☆☆☆**
SmartScrap and The Clipper are two useful DA utilities for graphics work. SmartScrap is a major enhancement to the standard Scrapbook DA. The Clipper provides a transparent Clipboard window that lets you resize or crop a graphic to the area in which it will be pasted. Compatible with System 7. Version 1.0 reviewed. Version 2.1 shipping. Requires Mac Plus or later and System 6.0.3 or later. \$89.95. Solutions, Inc., P.O. Box 783, Williston, VT 05495. (802) 865-9220. (July '87) ★ '87 Eddy

Snapshot **☆☆☆☆**
Snapshot is a DA/INIT utility that lets you capture full or partial screens. Differs from similar products in that captured window remains on-screen within a real window, which you can use as you work. All or part of a screen, window, dialog box, or menu can be captured as a color or a black-and-white image. Supports PICT or paint formats. No way to scale or crop captured images or to save them as startup screens, but these features are available in other painting applications. Version 3.0 reviewed. \$59.95. Wildflower Software, 21W171 Coronet Rd., Lombard, IL 60148. (708) 916-9360. (June '91)

Streamline **☆☆☆☆**
Streamline is a dedicated PostScript auto-trace package. Can quickly produce nearly print-ready traces with little tweaking. Retains original scanned images' black-and-white values. Final touch-ups must be completed in Illustrator or a similar program. Continuous-tone photos aren't usually worth the trouble. Version 1.0 reviewed. Version 2.0 shipping. Requires Mac Plus or later and System 4.2 or later; 2 MB of RAM recommended. \$195. Adobe Systems, 1585 Charleston Rd., P.O. Box 7900, Mountain View, CA 94039. (800) 344-8335 or (415) 961-4400. (Nov '89)

StrataVISION 3d **☆☆☆☆**
StrataVISION 3d brings main-frame rendering power to the Mac—but you need a lot of RAM and a lot of patience. It's a modeling and visualization tool that can create photo-realistic 3-D images.

Rendering can take hours, but it can also be done in the background so you can do other work. Conspicuously lacks precision options. Several texture and shape libraries are available. Version 1.03 reviewed. Version 2.0 shipping. Requires Mac II series with FPU and a hard-disk drive and at least 2 MB of RAM. \$995; texture libraries, \$139 each; shape libraries, \$179 each. Strata, Inc., 2 W. St. George Blvd., Ancestor Sq., Ste. 2100, St. George, UT 84770. (800) 678-7282 or (801) 628-5218. (May '90)

Swivel 3D Professional **☆☆☆☆**
Swivel 3D Professional is a color-modeling program that forms shaded solids speedily. Casts shadows onto other objects and can project color graphics onto solids. Objects can be manipulated as jointed and sliding mechanisms without accidental dismantling. Can tween-animate objects or fly through scenes, saving frames for playback. Easy-to-use interface. Missing some professional tools, such as Bézier-curve editing and adequate links to MacRenderMan's RIB format. Version 1.5.8 reviewed. Requires Mac Plus or later, System 6.0.3 or later, and a hard-disk drive; color work requires Mac II series. \$695. MacroMind-Paracomp, Inc., 600 Townsend St., Ste. 310W, San Francisco, CA 94103. (415) 442-0200. (Aug '91) ★ '89 Eddy

Upfront **☆☆**
This 3-D architectural-sketching tool is intended for conceptual design. Draws and manipulates 3-D objects in colored, shaded perspective view, not merely as wire-frame outlines. Complex interface is poorly designed, and common tasks such as zooming and printing require numerous steps. Lacks several essential tools and features. Can't import DXF files. Supports use of PICT and scanned-image files as backdrops while drawing. Good control of solar lighting, but lacks other light sources. Exports files in PICT, Illustrator, DXF, or EPS formats. Version 1.01 reviewed. Requires Mac II series and a hard-disk drive. \$895. Alias Research, Inc., 110 Richmond St. E., Toronto, Ontario M5C 1P1, Canada. (416) 362-9181. (Dec '91)

Virtus WalkThrough **☆☆☆☆**
Virtus WalkThrough is a powerful modeling and visualization package that makes virtual-reality concepts available to ordinary desktop Macs. Provides two views of an imaginary building or other object: 2-D Design, which lets you create and precisely customize a model, and 3-D Walk View, which offers a real-time, rendered color perspective through which you navigate in any direction. Lacks import/export capabilities needed for serious CAD. Com-

pact data files. Version 1.0.3 reviewed. Version 1.1 shipping. Requires Mac Plus or later with 2 MB of RAM; a hard-disk drive recommended. \$395. Virtus Corp., 117 Edinburgh St., Ste. 204, Cary, NC 27511. (919) 467-9700. (July '91) ★ '90 Eddy

• CAD

Aperture **☆☆**
Aperture combines a CAD program with a database manager. Some of its numerous features are difficult to access, but generally the package is very useful. The database application is a decent flat-file manager, and the drawing portion of the package has color support, infinite zoom, and libraries, as well as other powerful tools. Version 1.0.2 reviewed. Version 1.6 shipping. Requires Mac Plus or later; SE/30 or Mac II series with 2 MB of RAM recommended. \$795. Aperture Technologies, Inc., 84 W. Park Place, Stamford, CT 06901. (800) 342-9022 or (203) 975-7587. (Apr '90)

Blueprint **☆☆**
Blueprint is an affordable, easy-to-use 2-D-CAD program that's a simplified version of MiniCad+. It is particularly useful for architectural drafting. Has complete drawing tools and excellent control over colors and patterns. Lacks a programming environment and integrated spreadsheet and database features. Includes superb symbol libraries and good control over layering and Boolean operations. Dimensioning commands and DXF import/export capabilities are weak, but reliably exports EPS graphics. Version 2.0 reviewed. Requires Mac Plus or later and a hard-disk drive. \$295; tutorial, \$89; plotter driver, \$300. Graphsoft, Inc., 8370 Court Ave., Ste. 202, Ellicott City, MD 21043. (301) 461-9488. (Sept '91)

Clariscad **☆☆☆☆**
Clariscad is an excellent choice for entry- or midlevel 2-D mechanical drafting. It's easy to master if you are proficient with MacDraw II. The most important new addition is a guide to location and construction of geometric features. It lacks an integrated spelling checker and offers only limited color support. There are special tools for architects, and mechanical engineers should like the well-implemented, ANSI-standard Geometric Dimensioning and Tolerancing system. Version 2.0 reviewed. Requires 2 megabytes of RAM. \$899; Clariscad Graphics Translator, \$299. Clariscad Corp., 5201 Patrick Henry Dr., Santa Clara, CA 95052. (408) 727-8227. (Mar '91)

Design Your Own Home: Architecture **☆☆**
Design Your Own Home: Architecture is a specialized drawing

program that produces simple housing floor plans and elevations. Its built-in parts libraries and many sample plans (that come from four separately available libraries) make the job easy. It's a decent drawing program. Version 1.0 reviewed. Version 1.6 shipping. Requires Mac Plus or later. \$99.95; additional design libraries, \$29.95 each. Abacadata Ltd., P.O. Box 2440, Eugene, OR 97402. (800) 451-4871 or (503) 342-3030. (May '90)

DesignCAD 2D/3D **☆☆**
DesignCAD 2D/3D is a 2-D-drafting and 3-D-rendering program with lots of rough edges. Point-orientation method of drawing takes some getting used to. Overwhelming screens with long menus and huge palettes. Weak interface. Version 1.0 reviewed. Version 3.0 shipping. Requires Mac Plus or later and System 6.03 or later. \$699. DesignCAD, Inc., One American Way, Pryor, OK 74361. (918) 825-4848. (Mar '90)

DynaPerspective **☆☆☆☆**
Presentation was the strength in earlier versions of this 3-D-CAD program. Necessary drafting capabilities have now been added, its rendering tweaked, and its animations made faster and smaller. You can use up to 16 drafting layers. DynaPerspective's limitation is its method for measuring relative distances. A powerful, versatile tool and a great value. Version 2.01 reviewed. Requires Mac II series with at least 2 MB of RAM and 8- or 24-bit video card; a hard-disk drive recommended. \$995. Dynaware USA, Inc., 950 Tower Ln., Ste. 1150, Foster City, CA 94404. (800) 445-3962 or (415) 349-5700. (Dec '90) ★ '90 Eddy

MiniCad+ 3.0 **☆☆☆☆**
With a fast and logical interface, MiniCad+ has a Pascal-like macro language, an internal database, 2-D as well as 3-D graphics, a linked spreadsheet, and a low price. Has a MacDraw-like feel, but it may have the best 3-D capabilities among low-cost CAD programs. Good documentation. Graphsoft's tech support is helpful. Version 3.0 reviewed. Requires Mac Plus or later with 2 MB of RAM, System 6.0, and a hard-disk drive. \$795. Graphsoft, Inc., 8370 Court Ave., Ste. 202, Ellicott City, MD 21043. (301) 461-9488. (Apr '91) ★ '90 Eddy

PowerDraw **☆☆**
PowerDraw is an easy-to-use 2-D-CAD program with a host of features, including an interactive snap function that aids in geometry creation. Offers complete drawing tools and excellent control over colors, true vector-oriented patterns, and Boolean operations such as joins and intersections. Has full complement of dimensioning

MICE RATINGS ☆ ☆ 1/2 ☆☆ ☆☆ 1/2 ☆☆☆ ☆☆☆ 1/2 ☆☆☆☆ ☆☆☆☆ 1/2 ☆☆☆☆

commands. Built-in import/export capabilities are limited to PICT files, but optional PowerDraw Translator handles a variety of graphics conversions. Includes built-in plotter driver that spools print files to disk. Version 3.0 reviewed. Requires Mac Plus or later and a hard-disk drive. \$795; PowerDraw Translator, \$275. Engineered Software, P.O. Box 18344, Greensboro, NC 27419. (919) 299-4843. (Sept '91)

Precision 444

Precision is a 2.5-D CAD program with some quirks. The Cut and Paste functions operate oddly, and many things don't work as expected. The program is powerful but slow. It freezes and crashes at times. When these problems are cleaned up, it should be superb. Version 1.2 reviewed. Requires SE/30 or Mac II series with 2 MB of RAM. \$295. Innovative Systems, Inc., P.O. Box 461, 143 Shaker Rd., East Longmeadow, MA 01028. (800) 222-1648 or (413) 525-6500. (Apr '90)

Vellum 2.0 444

Vellum 2.0 is a powerful 2-D CAD package for architectural and mechanical drafting. Smart-cursor feature informs you of cursor's measured position relative to designated point on an object. Allows comprehensive control of line tools, resizable geometric shapes, and text. The program supports ANSI Y14.5 drawing standard and calculates 2-D properties such as area, perimeter, and moment of inertia. Intelligent tools and symbols automatically adjust surrounding wall surfaces. Supports PICT, ASCII, IGES, and DXF file formats. Exports EPS, DXF, and DXB files. Over networks, Vellum files are compatible with Windows 3.0 version of program. Version 2.0 reviewed. Requires Mac II series, at least 4 MB of RAM, and a hard-disk drive. \$1,995. Ashlar, Inc., 1290 Oakmead Pkwy., Ste. 218, Sunnyvale, CA 94086. (408) 746-1800. (Dec '91) ★ '89 Eddy

VersaCad 444

VersaCad is a powerful CAD program that doesn't show any of its DOS roots. Excellent element manipulation and full plotter support. Library user interface is crude. Version 1.0 reviewed. Version 3.0 shipping. Requires Mac Plus or later. \$2,395. Computervision (Personal CAD/CAM Business Unit), 100 Crosby Dr., Bedford, MA 01730. (800) 488-7228 or (617) 275-1800. (July '88) ★ '88 Eddy

• CLIP ART

650 Megabyte Clip-Art Disk

The 650 Megabyte Clip-Art Disk is a CD-ROM containing 182 scanned TIFF images and 886

mostly color EPS files in Adobe Illustrator 88 format. EPS graphics are of amateur quality; TIFF files are more useful. The quality of the scans is adequate, but many of the images are marred by washed-out colors or are too dark to be useful. Requires Mac Plus or later and a CD-ROM drive. \$499.95. Media Clip-Art, 1879 Old Cuthbert Rd., Unit #10, Cherry Hill, NJ 08003. (609) 795-5993. (Sept '90)

Artbeats 444

Artbeats is a series of superb, high-tech EPS backgrounds. Five packages (Dimensions 1 and 2, Potpourri, and Natural Images 1 and 2) offer abstract, geometric, and natural images. Each package has 20 full-page backgrounds, saved as both FreeHand and EPS files. These are complex backgrounds, often with sophisticated blends that demand RAM and are time-consuming to print (the results are worth it). Requires Mac Plus or later with 2 MB of RAM; a hard-disk drive recommended. Dimensions 1, \$79.95; Dimensions 2, \$99.95; Potpourri, \$99.95; Natural Images 1, \$99.95; Natural Images 2, \$129.95. Artbeats, P.O. Box 20083, San Bernardino, CA 92406. (714) 881-1200. (Nov '90)

ArtClips 444

ArtClips is a pair of EPS artwork collections that are generally well done but poorly organized. Includes sports, home, technology, and business themes. Version 1.0 reviewed. Requires Mac Plus or later. First edition, \$99; second edition, \$129. Tactic Software Corp., 11925 S.W. 128th St., Miami, FL 33186. (800) 344-4818 or (305) 378-4110. (Aug '89)

Canned Art: Clip Art for the Mac 444 1/2

Canned Art: Clip Art for the Mac is a printed catalog of more than 15,000 images currently available on-disk. Most images are reduced, so several fit on a page. Excellent detailed index saves hunting through disks. \$29.95; sample disk, \$10. PeachPit Press, 2414 Sixth St., Berkeley, CA 94710. (800) 283-9444 or (510) 527-8555. (Sept '90)

Click & Clip 444

The Click & Clip packages are graphics with seasonal themes. Of the two quarterly editions released as of August 1988, the spring 1988 package is the better collection. Version 1.0 reviewed. Quarterly editions, vol. 1-10, \$39.95; C&C 500, \$395; C&C Military Art 1.1, Medical/Health 1.3, and Business 1.5, \$149 each; Road and Warning Signs 1.2 and International Symbols 1.6, \$99 each; Borders 2.8, \$79; Christmas 2.2 and Seasonal 2.2, \$19.95 each. Studio Advertising Art, P.O. Box 43912, Las Vegas, NV 89116. (702) 641-7041. (Aug '88)

ClickArt 444

The ClickArt series consists of numerous MacPaint-format and EPS packages. Themes include business, sports, animals and nature, holidays, religion, and cartoons. Artwork is generally well drawn; some collections are a bit unfocused, but overall this is a good buy. MacPaint-format packages include useful ClipOut DA and a HyperCard stack. MacPaint packages, \$49.95 each; EPS packages, \$129.95 each. T/Maker Co., 1390 Villa St., Mountain View, CA 94041. (415) 962-0195. (Nov '90)

Clipables 444

Clipables is an enormous collection of EPS artwork. The 600 images—10 MB of data—are well drawn and cover a wide range of topics. A broad but shallow package. \$149.95. C.A.R., 7009 Kingsbury, St. Louis, MO 63130. (314) 721-6305. (Mar '87)

Cliptures 444

Cliptures is a series of business-oriented EPS clip-art packages, with one sports collection included. Volume 2, Business Images 2, is the best collection. Version 1.0 reviewed. \$129.95. Dream Maker Software, 7217 Foothill Blvd., Tujunga, CA 91042. (800) 876-5665 or (818) 353-2297. (Aug '89)

Collector's Editions I and II 444 1/2

The Adobe Collector's Editions offer excellent selections of basic graphic elements for Illustrator users. Symbols, Borders & Letterforms contains a wide range of dingbats, borders, and two editable alphabets. Patterns and Textures provides more than 400 patterned fills, including standard patterns used in architecture, mapmaking, meteorology, and geology. These files are formatted as Illustrator documents and must be resaved in EPS format before being imported into other programs. Requires Adobe Illustrator. Symbols, Borders & Letterforms, \$125; Patterns and Textures, \$225. Adobe Systems, 1585 Charleston Rd., P.O. Box 7900, Mountain View, CA 94039. (800) 344-8335 or (415) 961-4400. (Nov '90)

Digit-Art 444

Digit-Art is an overwhelming collection of EPS clip art available on floppy disk and on CD-ROM. Comes with a well-designed catalog of images. More than 20 volumes are available. Version 1.0 reviewed. Version 5.0 shipping. Requires a program that reads EPS files. CD-ROM, \$799; single volume (disk), \$99; two volumes (disk), \$149; three volumes (disk), \$198. Image Club Graphics, Inc., 1902 Eleventh St. S.E., Ste. 5, Calgary, Alberta T2G 3G2, Canada. (800) 661-9410 or (403) 262-8008. (Aug '88)

Graphics Pak 444

The ArtWare Graphics Pak is a large collection of clip art with uneven quality. The borders are the most elegant. Other packages are available. Version 1.0 reviewed. \$149.95. ArtWare Systems, Inc., 6512 Six Forks Rd., Ste. 502A, Raleigh, NC 27615. (800) 722-3764 or (919) 870-9593. (Aug '88)

Images with Impact! 444 1/2

Images with Impact! has three collections of superb, imaginative EPS clip art. The Business package contains 175 images of people, equipment, and office situations. Graphics & Symbols covers several topics and drawing styles. Accents & Borders (winner of a *MacUser* Editors' Choice Award) contains 270 design elements, including borders, frames, ornaments, symbols, and mortises; registered users receive a bonus disk of color artwork. Images are opaque, and most are strategically subgrouped for easy editing. Excellent manual. Business package, \$129.95; Graphics & Symbols, \$99.95; Accents & Borders, \$129.95. 3G Graphics, 11410 N.E. 124th St., Ste. 6155, Kirkland, WA 98034. (800) 456-0234 or (206) 367-9321. (Nov '90) ★ '90 Eddy

Japanese Clip Art 444 1/2

Japanese Clip Art is extraordinary. Consists of MacPaint documents and separate fonts. Volume I, Heaven, covers mythological subjects; Volume II, Earth, offers secular subject matter. Version 1.0 reviewed. Each volume, \$79.95; Year of the Dragon '88, \$29.95. Qualitas Trading Co., 6907 Norfolk Rd., Berkeley, CA 94705. (510) 848-8080. (Apr '87)

MacGallery 444

MacGallery is a whimsical collection of MacPaint images, ideal for children's publications, newsletters, and invitations. The 400 original illustrations include holidays, food, sports, borders, animals, plants, babies, teddy bears, dinosaurs, and cartoon arms and legs. Excellent manual. Requires Mac Plus or later and graphics program compatible with MacPaint-format files. \$49.95. Dream Maker Software, 7217 Foothill Blvd., Tujunga, CA 91042. (800) 876-5665 or (818) 353-2297. (Nov '90)

MacGraphics 444

MacGraphics is a collection of bit-mapped clip art on 13 thematic disks. Most pictures are full-page, and unfortunately, reproduction quality suffers when they are reduced. Version 3.0 reviewed. \$225. GoldMind Publishing, 4994 Tulsa Ave., Riverside, CA 92505. (714) 687-3815. (Feb '89)

Metro ImageBase Electronic Art 444 1/2

Metro ImageBase Electronic Art is a series of TIFF and EPS clip art

MINIFINDERS

from a pioneer in the clip-art industry. Huge traditional-looking images, which requires a lot of disk space. There are 18 volumes available. Requires Mac Plus or later and a hard-disk drive. \$145 per volume. Metro ImageBase, Inc., 18623 Ventura Blvd., Ste. 210, Tarzana, CA 91356. (800) 525-1552 or (818) 881-1997. (Aug '89)

Professional Photography Collection, Volume 1

This CD-ROM contains 100 color TIFF images. Each image comes in three formats: 24-bit high-resolution color, 24-bit low-resolution color, and 8-bit black-and-white. Strikingly clear, high-quality images. Includes printed catalog and a liberal rights policy. This collection is an excellent buy. Requires Mac II series, a color monitor, and a CD-ROM drive. \$149. discimagery, 18 E. 16th St., New York, NY 10003. (212) 675-8500. (Sept '90)

SwivelArt

SwivelArt is a collection of 3-D images and fonts for use with Swivel 3D Professional or other programs. Includes a read-only version of Swivel 3D Professional, serif and sans-serif 3-D fonts, a HyperCard stack that lets you create 3-D text, and more than 100 3-D maps, images of office equipment, and words and symbols commonly used in business presentations. Swivel 3D Professional can manipulate and edit the images, or images can be exported in PICT or EPS formats to other graphics applications. Version 1.2.4 reviewed. Requires Mac Plus or later, System 6.0.3 or later, and a hard-disk drive; color work requires Mac II series or later. \$125. MacroMind-Paracomp, Inc., 600 Townsend St., Ste. 310W, San Francisco, CA 94103. (415) 442-0200. (Aug '91)

Totem Graphics

Totem Graphics has 13 volumes of PostScript images in 24-bit color. Color blends and fine details look superb even when printed in black-and-white. The 13 categories emphasize animals and plants but also include holidays, food, sports, and people. Images are available in four formats and are fully editable. Requires Mac Plus or later and a hard-disk drive; requires Mac II series for color images. \$125 per category; \$995 for CD-ROM with all categories. Totem Graphics, 5109A Capitol Blvd., Tumwater, WA 98501. (206) 352-1851. (Oct '89)

WetPaint

WetPaint is a ten-volume series that contains massive quantities of well-drawn MacPaint graphics. The best-seller is Classic Clip Art. Other titles include Publishing, Animal Kingdom, Special Occasions, Industrial Revolution, Island Life, and All the People. Art

styles range from line drawings to digitized images, and several packages contain images reminiscent of woodcuts and other "antique" graphics. MacTut is a unique collection of ancient Egyptian artwork along with hieroglyphic fonts. All volumes include ArtRoundup and Pattern Mover DAs. Each volume, \$89.95. Dubl-Click Software, Inc., 9316 Deering Ave., Chatsworth, CA 91311. (818) 700-9525. (Sept '87)

DRAWING & PAINTING

Amazing Paint

A sense of fun pervades this black-and-white painting program, which also has a friendly price tag. Extensive special-effects feature list and many clever tools make the program useful for graphics pros and doodlers alike. Has glitzy text functions and flexible print options. Allows multiple levels of Undo. Supports ATM and TrueType. Poor documentation. Version 1.0.1 reviewed. \$79.95. CE Software, Inc., 1801 Industrial Cir., P.O. Box 65580, West Des Moines, IA 50265. (800) 523-7638 or (515) 224-1995. (Oct '91)

Azimuth

Azimuth is a solid mapmaking program that lets you build maps of the earth based on a view from space. Produces excellent maps but suffers from interface problems. Selection of export formats is too limited. Version 1.0 reviewed. Requires Mac Plus or later. \$395. Graphsoft, Inc., 8370 Court Ave., Ste. 202, Ellicott City, MD 21043. (301) 461-9488. (Apr '90)

CA-Cricket Draw

CA-Cricket Draw is an object-oriented drawing program that produces high-quality output. Designed to print on PostScript-compatible devices. Version 1.0 reviewed. Version 1.1.1 shipping. Requires Mac Plus or later, System 6.0.3 or later, and a second disk drive or hard-disk drive. \$199. Computer Associates International, Inc., 1240 McKay Dr., San Jose, CA 95131. (800) 531-5236 or (408) 432-1727. (May '87)

Canvas

Canvas 2.0 is a rich drawing/painting program that features full Bézier curves; the cutting and joining of polygons; skewing, perspective, and distortion capabilities; auto-dimensioning; area and perimeter calculation; auto-tracing of bit maps; and full-color support. The program creates and edits high-resolution bit maps to 2,540 dpi. Slightly less-powerful DA version available. Version 2.0 reviewed. Version 3.0 shipping. Requires Mac Plus or later and System 6.0.2 or later. \$395. Deneba Software, 3305 N.W. 74th

Ave., Miami, FL 33122. (800) 622-6827 or (305) 594-6965. (Apr '89) ★ '89 Eddy

Color MacCheese

Color MacCheese is an inexpensive, full-color painting program that is designed for artistic fun, not as a professional tool. Two noncustomizable palettes are provided, resolution is limited to 72 dpi, and there are no rulers. Only one document can be opened at a time. But for casual painters who want to get to work immediately, Color MacCheese is perfect. Version 1.05 reviewed. \$99. Delta Tao Software, Inc., 760 Harvard Ave., Sunnyvale, CA 94087. (800) 827-9316 or (408) 730-9336. (Mar '91)

Comic People, Volume 2:

Kid Stuff

Comic People, Volume 2: Kid Stuff is a set of Comic Strip Factory add-ons, drawn by Trici Venola and Kurt Wahlner. Extraordinary quality and range. Kid Stuff presents five children and two grown-ups of both sexes and various ethnic backgrounds. Also included are backgrounds, sound effects, a very spry cat, and some Little Extras. Best used from within Comic Strip Factory. Requires Mac Plus or later. \$39.95. Foundation Publishing, Inc., 14228 Shore Ln., Prior Lake, MN 55372. (612) 445-8860. (Aug '90)

The Comic Strip Factory

The Comic Strip Factory is an assembly program for creating comic strips. Includes a database of parts for various characters as well as backgrounds for panels. Good text editing in balloons. Can import and export in MacPaint format. Version 1.0 reviewed. Version 1.6 shipping. Requires Mac Plus or later. \$69.95. Foundation Publishing, Inc., 14228 Shore Ln., Prior Lake, MN 55372. (612) 445-8860. (Dec '87)

Crystal Paint

Crystal Paint creates an electronic kaleidoscope. It's MacPaint's Brush Mirrors function gone wild in a small, simple — yet wonderful — application. Doesn't work in color on Mac II. Version 1.0 reviewed. Version 1.02 shipping. Requires Mac 512K or later. \$49.95. Great Wave Software, 5353 Scotts Valley Dr., Ste. E, Scotts Valley, CA 95066. (408) 438-1990. (Feb '88)

DeskPaint and DeskDraw

DeskPaint and DeskDraw are reasonably full-featured, 24-bit color painting and drawing programs in DA form. Flexible calibration options for vertical and horizontal rulers. Printer resolution can reach 4,000 dpi. DeskPaint has enough color controls and image-manipulating functions to satisfy any user except professional electronic artists. Version 3.03 reviewed.

Requires a color display system, 2 MB of RAM, and a hard-disk drive. \$199.95. Zedcor, 4500 E. Speedway #22, Tucson, AZ 85712. (602) 881-8101. (Mar '91)

DrawTools

DrawTools self-installs three DAs for use with MacDraw II. Sizer does exact scaling and dimensioning, calculates enclosed areas, and lets you resize a drawing. Adjacency brings together any two selected objects. Tools adds a handy menu that lets you clip or extend existing lines and build fillets. Can be awkward to use. Version 1.1 reviewed. Version 1.1.1 shipping. Requires Mac Plus or later and MacDraw II version 1.0v4 or 1.1v2. \$99.95. MacroMind-Paracomp, Inc., 600 Townsend St., Ste. 310W, San Francisco, CA 94103. (415) 442-0200. (July '90)

Easy Color Paint

Easy Color Paint is a low-cost 8-bit (256-color) painting program. Supports color QuickDraw printers and WACOM pressure-sensitive digitizing tablets. Allows user-editable colors, patterns, and color blending. Offers gradient fills. Handy Preference files save customized interface configurations. Good performance. Poor manual. Version 2.003 reviewed. Requires color-capable Mac. \$89. Creative Software, 3213 Annandale Rd., Durham, NC 27705. (800) 367-6899 or (919) 493-9503. (Nov '91)

FreeHand

FreeHand 3.0 is a professional color PostScript illustration package. Includes auto-trace, 100 levels of undo, freehand drawing, and a powerful Blend command. Version 3.0 improves text manipulation but relies on dialog box for input. Fast screen redraw. New tool palettes (Layers, Colors, and Styles). Can edit in Preview mode. Allows Pantone, spot, or CMYK process color controls. Displays, separates, and prints 32-bit color TIFF images, and generates EPS files compatible with OPI (Open Prepress Interface) system. Steep learning curve, but has streamlined, easy-to-navigate interface. Version 3.0 reviewed. Requires Mac Plus or later and at least 2 MB of RAM. \$595. Aldus Corp., 411 First Ave. S., Seattle, WA 98104. (800) 333-2538 or (206) 628-2320. (July '91)

Illustrator

Illustrator is a professional color PostScript graphics program from the people who defined the PostScript language. Its extremely powerful, compact toolbox offers more drawing tools than did earlier versions. New charting functions can import detailed spreadsheet data as text, which Illustrator automatically converts into complex, easily customized charts (changes to imported numerical

data also update the chart). Uses a freehand drawing mode or bit-mapped templates for detailed artwork. Version 3.0 reviewed. Version 3.2 shipping. Requires Mac Plus or later. \$595. Adobe Systems, 1585 Charleston Rd., P.O. Box 7900, Mountain View, CA 94039. (800) 344-8335 or (415) 961-4400. (Feb '91) ★ '88 Eddy

Kid Pix 1/2

Kid Pix is a simple color painting program that has entertaining sounds and attention-grabbing, animated special effects. Wacky Brushes includes drippy paint and soda-pop bubbles. The Electric Mixer thrashes drawings, the Splash tool drops big blobs of paint, and Rubber Stamps gives you a choice of 80 images (such as frogs, birds, and ice-cream cones) and drops your choice wherever you click the cursor. Erasers include the Black Hole, which swallows up the artwork, and Firecracker, which blows everything to smithereens. Sounds include English and Spanish pronunciation of alphabet letters. Version 1.0 reviewed. Version 1.2 shipping. Requires color-capable Mac; sound recording requires System 6.0.7 or later and a microphone. \$59.95. Broderbund Software, Inc., P.O. Box 6125, 500 Redwood Blvd., Novato, CA 94903. (800) 521-6263 or (415) 382-4400. (Aug '91)

MacCalligraphy 1/2

MacCalligraphy simulates brush painting. User-designed Seals and Touches enable you to design a signature tool and the style of brush you use. Takes some getting used to. Handsome custom-built wooden box stores disks and documentation. Version 1.0 reviewed. Version 2.01 shipping. \$149.95. Qualitas Trading Co., 6907 Norfolk Rd., Berkeley, CA 94705. (510) 848-0808. (Feb '88)

MacDraft 1/2

MacDraft is an object-oriented drawing program that offers a rich set of features for a moderate price. Object rotation is precise, and it accesses the full spectrum of 16.7 million colors. It is particularly appropriate for high-school or college-level introductory CAD classes or for small architectural/construction contracting businesses. Version 2.0 reviewed. Version 2.1 shipping. Requires Mac Plus or later, System 6.0.2 or later, and a hard-disk drive or two floppy drives. \$399. Innovative Data Design, Inc. (idd), 2280-A Bates Ave., Concord, CA 94520. (510) 680-6818. (Oct '90)

MacDraw II 1/2

MacDraw II updates the venerable, popular, object-oriented drawing program. Easy to use. Supports 8-bit color import and export, including PICT II format. Users can upgrade to new version.

MacDraw Pro. Version 1.0 reviewed. Version 1.1v2 shipping. Requires Mac Plus or later. \$399. Claris Corp., 5201 Patrick Henry Dr., Santa Clara, CA 95052. (408) 727-8227. (Nov '88) ★ '85 Eddy

MacDraw Pro 1/2

This updated version of Claris' popular illustration program offers an elegant, intuitive interface and a variety of tools. No longer a bare-bones drawing program, MacDraw Pro offers precise text manipulation, a range of file-translation and -import capabilities, support for 32-bit-color images (including gradient shading), and complex charting. Bezigon tool allows sophisticated design and editing of Bézier curves and polygons. Version 1.0v1 reviewed. Requires Mac with 4 MB of RAM, System 6.0.3 or later, and a hard-disk drive. \$399; upgrade, \$99. Claris Corp., 5201 Patrick Henry Dr., Santa Clara, CA 95052. (408) 727-8227. (Nov '91)

MacPaint 1/2

MacPaint hasn't lost its shine after all these years. Supports multiple windows, design templates, and a magic eraser for corrections. It lacks free-rotation and distortion capabilities. Version 2.0 reviewed. Requires Mac Plus or later. \$125. Claris Corp., 5201 Patrick Henry Dr., Santa Clara, CA 95052. (408) 727-8227. (July '88) ★ '85, '87 Eddy

Photon Paint 1/2

Photon Paint doesn't rival its high-end competition, but it does offer a workable painting environment, multiwindow capability, some interesting special effects, and a lower price. Version 1.0 reviewed. Version 1.1 shipping. Requires Mac II with color card and System 6.0.3 or later. \$149.95. Micro-Illusions, Inc., P.O. Box 3475, Granada Hills, CA 91394. (818) 785-7345. (May '89)

PixelPaint 1/2

PixelPaint is a straightforward 256-color (8-bit) painting program with a good interface, practical tools, and special effects. Works with many file formats. Four-color-separation capability is built in. Includes PixelScan utility with excellent 8-bit imaging for Sharp and Howtek color scanners. Version 2.0 reviewed. Version 2.1 shipping. Requires Mac II series or SE/30 with 8-bit color board and 2 MB of RAM, System 6.0.3 or later, color monitor, and hard-disk drive. \$249. SuperMac Technology, 485 Potrero Ave., Sunnyvale, CA 94086. (800) 334-3005 or (408) 245-2202. (Oct '89)

PixelPaint Professional 1/2

PixelPaint Professional's significantly improved interface allows multiple open documents and floating palettes. Offers extensive support for CMYK color separations and provides an independent

PostScript text layer. Includes several color-blending and -manipulating tools as well as anti-aliasing capabilities. A serious, powerful tool for electronic artists. Excellent documentation. Version 2.0 reviewed. Version 2.0.1 shipping. Requires Mac with 4 MB of RAM, a 24-bit-color display system, and a hard-disk drive. \$799. SuperMac Technology, 485 Potrero Ave., Sunnyvale, CA 94086. (800) 334-3005 or (408) 245-2202. (Oct '91)

Relational Objex 1/2

Relational Objex (formerly called Paradigm) is a drawing program with a difference. It does relational drawing (and does it very well) in which each point's position depends on the location of other points — if you move a point, the rest of the drawing retracts correspondingly. Version 1.0 reviewed. Requires Mac Plus or later. \$240. SoftStream International, Inc., 19 White Chapel Dr., Mount Laurel, NJ 08054. (800) 262-6610 or (609) 866-1187. (Mar '90)

Studio/1 1/2

Studio/1 is an excellent monochrome painting program that also has impressive flip-frame animation capabilities. It has an uncluttered animation surface, painting tools with 300-dpi capabilities, and a HyperCard playback utility (XCMD). Version 1.0 reviewed. Requires Mac Plus or later. \$149.95. Electronic Arts, 1450 Fashion Island Blvd., San Mateo, CA 94404. (800) 245-4525 or (415) 571-7171. (Sept '89)

Studio/8 1/2

Studio/8 is a professional color (8-bit or 256-color) painting application for the Mac II. It has a superior tool set, an elegant interface, and excellent performance and speed. Version 1.1 reviewed. Version 2.0 shipping. Requires Mac II series or LC with hard-disk drive; 2 MB of RAM recommended. \$295. Electronic Arts, 1450 Fashion Island Blvd., San Mateo, CA 94404. (800) 245-4525 or (415) 571-7171. (Jan '89) ★ '88 Eddy

Studio/32 1/2

Many graphic artists think that this is the ideal color-painting program. Studio/32 provides many special tools and effects, including airbrush, gradients and blends, smudge, and anti-aliasing. A PostScript text layer keeps letters fully editable and as sharp as the available printer will allow. Its unusual effects include spherization; perspective; free rotation; resizing/stretching; transparency; and the "magic wand," which selects only certain pixels within an adjustable color range. Despite its power, Studio/32 is exceptionally easy to use. Version 1.0 reviewed. Version 1.2 shipping. Requires 24-bit-color display, 5 MB of

RAM, and a hard-disk drive. \$695. Electronic Arts, 1450 Fashion Island Blvd., San Mateo, CA 94404. (800) 245-4525 or (415) 571-7171. (Mar '91) ★ '90 Eddy

Super 3D 1/2

Super 3D is an update of an excellent 3-D object-oriented drawing program. Powerful features are easy to use. Three solid-rendering modes. Can export a scene as an object-oriented 2-D snapshot in PICT or EPS formats. Vertex-level editing gives precise control over every facet of objects. Easy to make global changes. Version 2.04 reviewed. Version 2.5 shipping. Requires Mac Plus or later, System 6.0.3 or later, and a hard-disk drive; requires Mac II series or later for color work. \$495. Aldus Corp., 411 First Ave. S., Seattle, WA 98104. (800) 333-2538 or (206) 628-2320. (Mar '90)

SuperPaint 1/2

SuperPaint is a combination painting/drawing program that includes features such as plug-in tools, auto-trace, Bézier curves, support for resolutions exceeding 300 dpi, and basic color support. A good program but not particularly fast. Version 3.0 will add sophisticated color controls, texture fills, gradients, and import capabilities. Version 2.0 reviewed. Version 3.0 shipping. Requires Mac Plus or later. \$199; upgrade, \$65. Aldus Corp., 411 First Ave. S., Seattle, WA 98104. (800) 333-2538 or (206) 628-2320. (July '89) ★ '87 Eddy

UltraPaint 1/2

UltraPaint is an 8-bit color-graphics program that's best suited for someone new to computer graphics and color, but experienced artists may also find it useful. It's a solid painting package with all the basic tools plus a variety of specialized tools and modes. It does have a somewhat-quirky interface. Version 1.0 reviewed. Requires Mac II series or LC with color monitor. \$199. Deneba Software, 3305 N.W. 74th Ave., Miami, FL 33122. (800) 622-6827 or (305) 594-6965. (Sept '90)

VideoPaint 1/2

VideoPaint isn't fast or easy to learn, and it comes with a manual that's difficult to comprehend. Offers a few special effects that other 8-bit-color painting programs can't match. VideoPaint includes drivers for Microtek and Sharp scanners, and it can import MacPaint, PICT/PICT2, PixelPaint, color TIFF, LZW, and Studio/8 files. Available export formats include EPS, gray-scale, and PostScript CMYK. Version 1.0 reviewed. Version 1.1 shipping. Requires Mac II series with 2 MB of RAM; LC version available. \$495. Olduvai Corp., 7520 Red Rd., Ste. A, South Miami, FL 33143. (800) 822-0772 or (305) 665-4665. (Feb '91) ★

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1. Please indicate which of the following computers you currently use in your company or organization: (check all that apply)

- ☐ a) Mac Plus ☐ d) IBM PC
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☐ c) Mac II

2. For how many micro computers do you buy products?

- ☐ f) 1-4
☐ g) 5-49
☐ h) 50+

3. Your primary job function is: (check one)

- ☐ i) Administrative/General Management
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☐ q) Project Managers
☐ r) Word Processors
☐ s) Database Managers
☐ t) Graphics
☐ u) CAD/CAM
☐ v) Communications
- HARDWARE**
☐ w) Mainframe
☐ x) Mini
☐ y) PC
☐ z) Printers/Plotters
☐ 1) Monitors
☐ 2) Disk/Tape Back-up
☐ 3) Add-in Boards
☐ 4) Communications

5. Are you involved in the purchasing of microcomputer equipment at your company?

- ☐ 5) Yes ☐ 6) No

6. If so, what function do you serve in the buying process?

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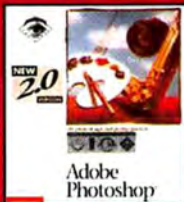
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1. Publication Title	2. Issue Frequency	3. Issue Date	4. Issue Period
MacUser	Monthly	10/1/91	10/1/91
5. Number of Issues Published Annually	6. Annual Subscription Price		
12	22.00		

7. Complete Mailing Address of Known Office of Publication (Street, City, County, State, and ZIP+4) (Do not leave blank)

One Park Avenue, New York, NY 10016

8. Complete Mailing Address of the Headquarters or General Business Office of Publisher (Do not leave blank)

One Park Avenue, New York, NY 10016

9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor (Do not leave blank)

J. Samuel Huey, 950 Tower Lane, Foster City, CA 94404

10. Title (Do not leave blank)

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11. Complete Mailing Address of Publisher (Do not leave blank)

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18. Complete Mailing Address of Subscription Office (Do not leave blank)

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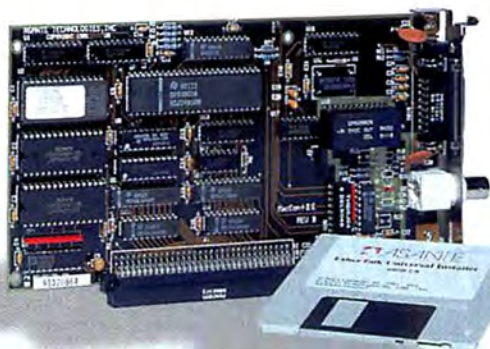
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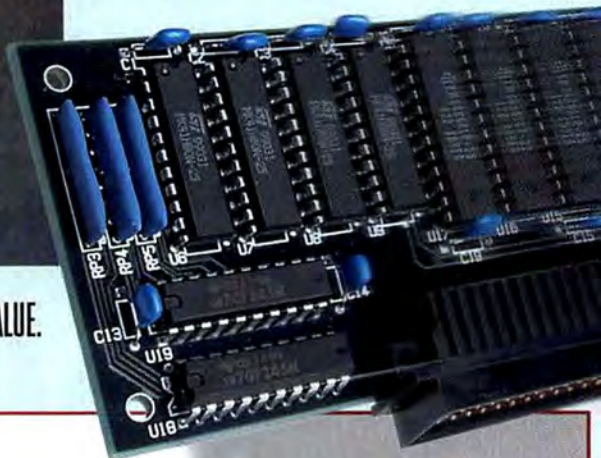
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"Only one company, La Cie, has a hard partitioning utility that lets you resize partitions without losing data."

Macworld, November 1989

"Sure winners, the lightweight, silent and inexpensive Cirrus drives from La Cie come with first-rate utility software... the cream of the crop."

Macworld, May 1989

"The best termination solutions, however, come with drives from La Cie..."

Macworld, March 1991

World Class Awards (7): (1) Hard Drive — Under 80MB, (2) Hard Drive — 80MB to 160MB (1st place), (3) Hard Drive — Over 160MB (1st place), (4) Optical Drive (1st place), (5) Best Customer Support — Hardware, (6) Removable Media — Drive, (7) Scanner — Color

Macworld, September 1991

"The choice is clear... buy the La Cie scanner."

**Macworld,
June 1991**

"My recommendation would be to go with La Cie Silverscanner and Photoshop..."

**MacDigest,
December 1990**

"La Cie's Photoshop plug-in offers more options than almost any other software."

**Publish,
August 1991**

Now that you've seen what they've said, see what they mean.

When the subject is scanners, seeing is believing.

So, to see what the critics are raving about, we thought it wise to show you just how good La Cie looks compared to the competition — in this case, the Microtek 600ZS.

The result? When you compare the two images side by side just like the experts did, La Cie's Silverscanner™ beats Microtek.

Fair and square.

The best hardware for the money.

When Macworld recommended buying the La Cie scanner, they must have had some very good reasons in mind.

Maybe it's because we offer the finest, most reliable hardware in the industry.

Or that the Silverscanner delivers the kind of superior performance usually found in machines costing thousands more.

Or the fact that you get high-quality, true-to-life color. Sharp, accurate scans. Production-quality

halftones with excellent detail in those troublesome shadow areas. Plus easy-to-use image controls, with full functions such as user-selectable halftoning, color dropout, gamma correction, brightness and color correction. All right at your fingertips.

Faster previews, faster scans.

If you've ever used a scanner, you know what it means to wait for the entire preview to finish before you can make any adjustments to your scan settings. It's a process that can burn up a lot of your time.

But thanks to our single dynamic preview window, you can modify your scanner functions *during* the preview. That means no more waiting around for the preview to finish before making your scan settings and starting your final scan. Suddenly, your previews take seconds instead of minutes.

In fact, the Silverscanner is so fast — and will save so much time — you can often finish your scans *before* other scanners are even finished previewing.



Microtek Scan



SilverScanner



Microtek Scan



SilverScanner



Microtek Scan



SilverScanner

For this comparison, we used a Microtek 600ZS and a La Cie SilverScanner. All scans were done at default settings with no corrections. The color images were separated using Adobe Photoshop. The top of the letter "C" in the La Cie logo was scanned at the maximum dpi setting (600 dpi on the Microtek 600ZS and 1200 dpi on the SilverScanner) and was enlarged so you can more easily see the difference. See the La Cie logo below scanned at 1200 dpi at actual size. You compare, you see the difference, the La Cie SilverScanner — better color, more shadow detail and smoother line art.

The hardware is great. The software is priceless.

The SilverScanner also comes with a great software package. And not some bargain-basement throwaways, either.

You get the software the experts are crazy about — state-of-the-art Adobe Photoshop 2.0, Letraset ColorStudio 1.5 with Shapes, plus La Cie's exclusive SilverScan plug-in modules. Valuable software that costs at least \$2,000 if bought separately.

All of which makes the SilverScanner very hard to beat.

To order, just pick up the phone.

By now, it should be clear why we're so excited about La Cie's SilverScanner. So, call 1-800-999-0143 today.

And see what all the talk is about.

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La Cie SilverScanner: 16.8 million colors; 256 smooth shades of gray; production-quality line art; up to 1200 dpi — all in a single pass.

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"La Cie hard drives include the best software we tested."

Macworld,
September 1989

"...The Good Housekeeping Seal. I'm now taking the safer course of buying from corporate-owned companies such as Quantum-backed La Cie..."

MacWeek,
February 1991

"La Cie offers the leading combination of software and performance."

Macworld,
March 1990

Here's one more reason to lug around an 80MB hard drive.

If you think La Cie's new 80MB PocketDrive™ comes with a big advantage, look closer.

It's a very small one.

Because until now, no one's ever loaded as much capacity into such a compact, portable and easy-to-use drive as La Cie.

Portability with a purpose.

So maybe you're a skeptic. And you're thinking that PocketDrive, being as small as a billfold, must somehow skimp on performance.

Wrong.

For starters, with 80MB of storage* it's plenty powerful, letting you store and transport more files and applications than you can shake a stick at.

And when you consider its all-new 2½ inch drive technology, fast 19ms seek time, plus the quietest operation this side of a mime troupe, it's clear that PocketDrive really gives you maximum performance in a minimum of space.

*Also available with 40MB.

Sets up in seconds.

You've heard that compact drives are a pain to connect and disconnect? Not anymore. Instead of plugging directly into the back of your Mac®, PocketDrive connects to a cable called PocketDock™. No more fumbling around at the back of your computer, connecting, disconnecting and reconnecting everything. And when you buy an additional PocketDock cable, you can leave *one* cable at work and *one* at home for even faster set up.

And for those times when you're on the road and you don't have access to your own computers, PocketDrive's optional miniature T-connector lets you plug into whatever Mac you're using.

You can count on Quantum. Plus Silverlining.

La Cie's reputation for reliability and stability starts on the inside, where we use only industry-leading Quantum drive mechanisms. (No other Mac-compatible drive mechanisms run faster.)

Because you can.

And with PocketDrive, you also get Silverlining.[™] Acclaimed as the most powerful hard disk management software in the industry, Silverlining's set of utilities maximizes the performance of SCSI drives like no other. In fact, MacUser was so impressed, they named Silverlining one of their *200 Best Macintosh Products*.

All this, plus a surprisingly affordable price.

So before you size up any other hard drive, call La Cie and prepare to get carried away with our amazing little PocketDrive. After all, if you're going to take your work home, why not put it in your pocket?



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Extra PocketDock Cable **\$ 99**

Miniature T-Connector **\$ 59**

Comes with 1 PocketDock cable, Silverlining software, and up to 5 year limited warranty.

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"The Cirrus 84 is a sleek, quiet 84MB hard disk drive. Five-year warranty."

MacUser,
February 1990



"The best performance, the most flexible installer software and good attention to support and hardware details."

MacWeek,
January 1990

"La Cie's Silverlining is a powerful formatter — it even has built-in timing loops that determine the optimum installation settings."

MacUser,
April 1991

Why should you plunk down your hard-earned money on a La Cie hard drive?

Well, the folks at Macworld, MacUser, MacWeek and other computer publications have been giving out some excellent reasons for years. With the consensus being that La Cie offers some of the hardest-working, fastest, most reliable drives you can own. Hard drives that continue to win design awards from both industrial and computer publications.

But if you'd like a few more reasons to buy a La Cie, consider that all of our hard drives up to 400MB come with the heart of a lion — in this case a built-in Quantum drive mechanism. It's about the fastest, most reliable, most respected mechanism around. With effective seek times as low as 8ms.

You're covered by our 2-Year Limited Warranty† which says that if, within two years, anything goes wrong with your drive's Quantum mechanism, we'll repair or replace it within 48 hours absolutely free. Plus, you can add an additional 3 years to your warranty for just \$1 per megabyte.*

And because we're backed by the resources of Quantum, you can count on us to provide high-quality mechanisms, components — plus customer service and support — for a long time to come.

Need more reasons to buy? Take a close look at our product listings. To order, or for even more information, call us at 800-999-0143. After all, when the subject is La Cie, we always love to talk.

Removable Cartridge Drive



- The performance of a fixed drive with the versatility of floppies
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Tape Drives



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- Features La Cie's award-winning Cirrus case

155MB Tape Drive \$ 74
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- Reusable cartridge are rereadable, rewritable, and erasable

600MB Optical Drive \$319
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PocketDrive™

- Portable, compact and easy to use
- 2½ inch drive
- Comes with one PocketDock™ cable

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40MB PocketDrive \$449
Miniature T-Connector \$ 59
Extra PocketDock cable \$ 99

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†Restrictions apply. Please contact La Cie for complete warranty information.

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- A wide range of storage capacity at an affordable price
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- External on/off termination switch
- Perfect for home, office or educational uses
- Wide range power supply (110-220)
- Silent, half-speed fan

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120MB ZFP Drive	\$ 529	\$ 579
200MB ZFP Drive	\$ 729	\$ 779
400MB ZFP Plus Drive	\$1399	\$1499
600MB ZFP Plus Drive	\$2049	\$2199
650MB ZFP Plus Drive	\$2249	\$2399
1.2GB ZFP Plus Drive	\$2749	\$2899
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*Not available for all Macintosh computers

Cirrus Drives

- Award-winning portable drive
- Access times as low as 15ms
- External on/off termination switch
- Operates silently thanks to its high volume, half-speed fan
- Wide range power supply (110-220)

50MB Cirrus Drive	\$ 439
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120MB Cirrus Drive	\$ 679
200MB Cirrus Drive	\$ 879
400MB Cirrus Drive	\$1599

Tsunami Drives

- Combines unique design, ultra-light weight and state-of-the-art components to make the Tsunami drive La Cie's most portable
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- External on/off termination switch
- Wide range power supply (110-220) plus convenience outlet

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Included free with every La Cie hard drive, Silverlining has been called the most powerful and useful hard disk management software in the industry. Silverlining maximizes the performance of all SCSI drives, giving you powerful volume-sizing functions and advanced partitioning features that allow as many as 60 partitions to be dynamically resized without data loss. Included in 200 Best Macintosh Products (*MacUser*, 1990).



Silverlining hard disk
management software,
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★★★★★ - MacUser

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Quantum drives have a two year warranty.

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80Mb	17ms	\$269	\$329
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210Mb	15ms	\$599	\$659
340Mb	14ms	\$979	\$1049

MICROPOLIS

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44Mb Removable Drive with Cartridge	\$429
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SyQuest revolutionized hard disk storage with **portability** and speed. Now, DGR Technologies ups the ante: 128 megabytes of removable, erasable optical storage on **fast**, ultra-reliable 3.5" disks. The 128REMTM represents substantial media savings over SyQuest 45MB and 38MB technology – do the math. The real savings, though, is peace of mind. Optical storage spells **reliability**: No more head crashes and no more magnetic data corruption. Above all, the **128REMTM** is built to perform: 9 millisecond average short seek time and a built-in 128K buffer translate into significant improvements over current removable standards – giving you the capacity and **performance** you've been waiting for. The 128REMTM is built with the future in mind, conforming to both ANSI and ISO standards, ensuring future **compatibility**. Price, Performance, Reliability. The DGR Technologies 128REMTM.

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80-24	\$349	\$409
335-11	\$1249	\$1349
426-14	\$1299	\$1369
670-16	\$1419	\$1519
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Q 105 MB 3.5" LPS	\$368	\$448
Q 120 MB 3.5"	\$448	\$548
Q 170 MB 3.5"	\$598	\$688
Q 210 MB 3.5"	\$688	\$748
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Wren 600 MB F/H	\$1598	\$1698
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14" GoldStar Color Sys.	\$388
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MAGIC 128MB REM OPTICAL

MAGIC 128MB 3.5" REMOVABLE ERASABLE OPTICAL

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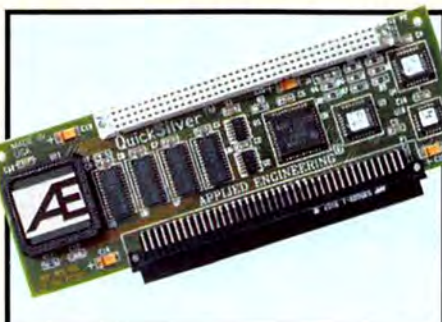
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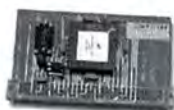
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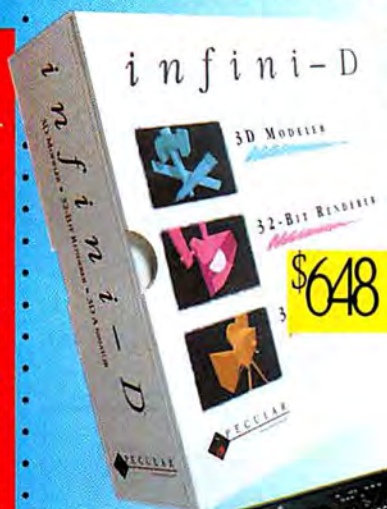
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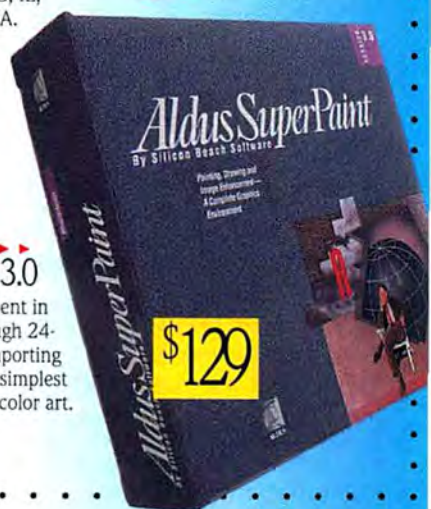
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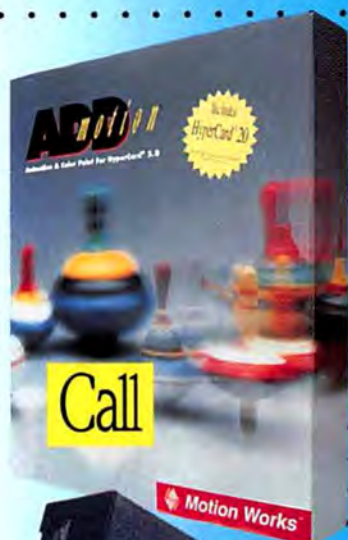


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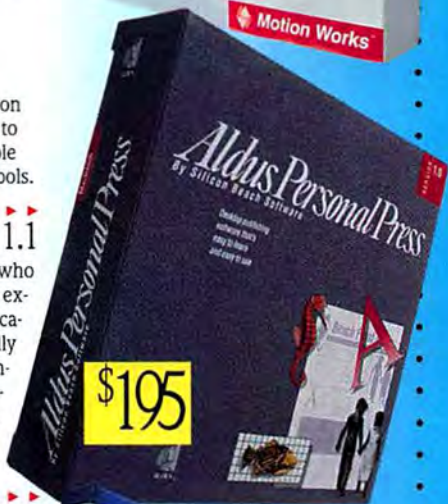


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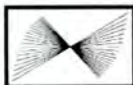
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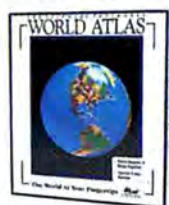
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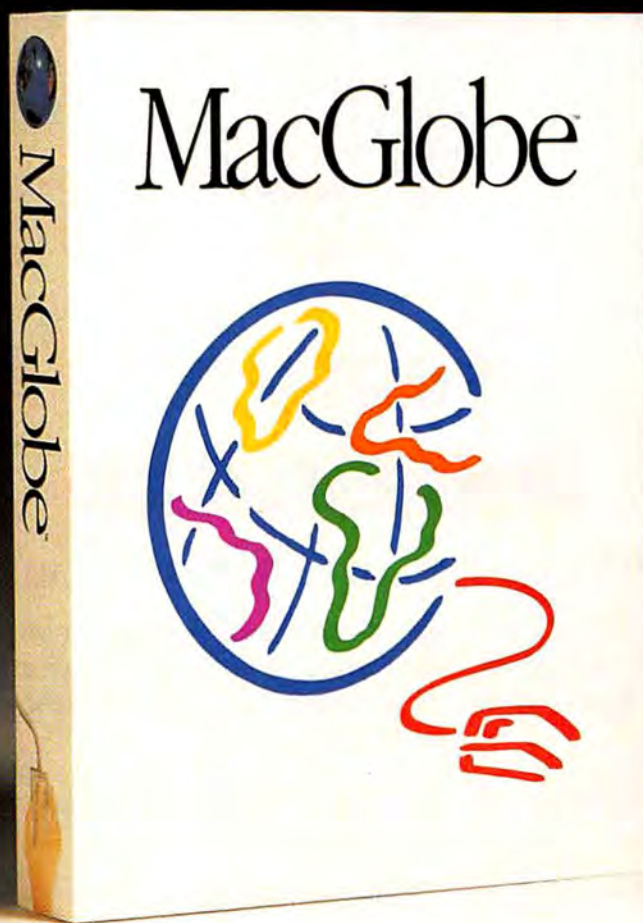
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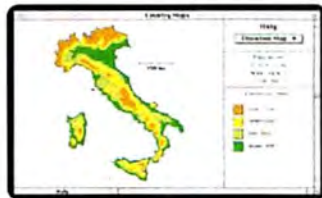
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Zmac is the 24-hour on-line resource for MacUser and MacWEEK. For the latest news, reviews, and electronic supplements, log on today. Zmac (the Z stands for Ziff, our parent company) is available on the CompuServe Information Network. You can connect to us by typing GO ZMAC on CIS or by following the instructions under "How to Join Zmac." Here are some of this month's Zmac highlights.

ResEdit: Step by Step

With ResEdit, you can change the look and feel of your system and applications by modifying icons and changing menus. But the changes you make can also cause crashes if you don't use ResEdit correctly. Zmac's Mark Simmons offers a step-by-step ResEdit tutorial this month that has five projects for customizing the desktop. Each technique is illustrated with sample resources. The file RESED5.SIT is available exclusively in Library 7 (Reference) of the Download & Support Forum (GO ZMC:DOWNLOAD).

Macro Attack

Using macros to script shortcuts and repetitive tasks is another way you can add functionality to your system, and one of the more time-consuming tasks is graphics manipulation. Zmac now offers a macro written by Craig Danuloff that automates the tiresome task of applying filters to an image with Photoshop. The macro was written with the commercial package Tempo II Plus, which you need to run the procedure. The filename is MACRO.CPT, and it's available exclusively in Library 9 (Source Code).

The Problem with Routers

Network managers who need to pinpoint problems with misdirected routers on their networks need PacketSend, a HyperCard 2.0 stack by MacUser's Kurt VanderSluis. You can download this troubleshooting shareware stack from Zmac in Library 6 (StackRoom) of the Download & Support Forum. The filename is PKTSND.SEA. It's also available on other on-line services or from user groups.

Zmac Shareware Tip: Removable-Cartridge Drives

Removable-cartridge drives such as those in this month's lab report are great for swapping volumes. However, if you use System 7 and want to assign a removable-cartridge drive as the home for your virtual RAM, you're out of luck. Apple prohibits this, because ejecting a disk with virtual RAM can lead to a system crash. If you want to live dangerously, get VMEject, a shareware extension that corrects the problem. VMEject works well with SyQuest but not with Bernoulli drives. VMEJECT.CPT is available in Library 3 (INITs, cdevs, FKEYs) in the Zmac Download & Support Forum.

How to Join Zmac

Here's how you can get access to Zmac:

- If you're a CompuServe (CIS) user, just type GO ZMAC at any ! prompt.
 - If you're not a CIS subscriber, you can sign up for Zmac by following these directions:
 1. Call (800) 635-6225 or (614) 457-8600 to find your local access number.
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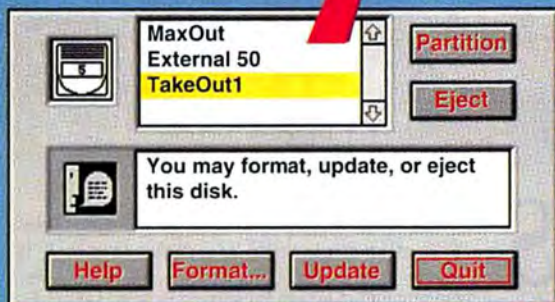
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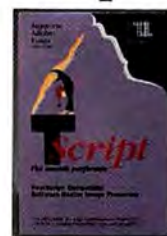
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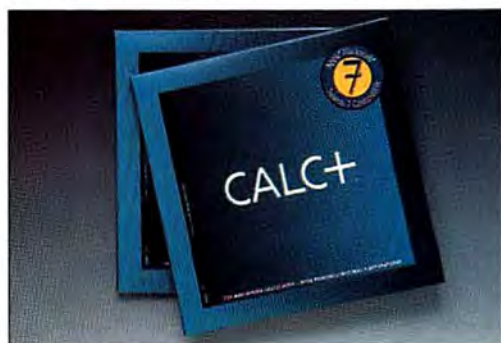
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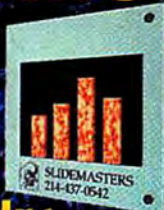
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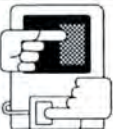
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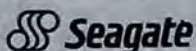
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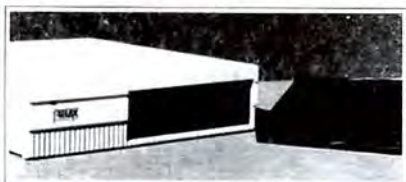


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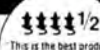
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Who Killed Apple?



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Here's the joke that's going around the Valley:

Q: What do you get when you cross IBM with Apple?

A: IBM.

This, of course, isn't funny to anyone who's heavily invested in the Mac. This isn't funny to anyone who likes the Mac. It's not even funny to me. How can I exist as *MacUser's* anti-editor if the Mac becomes an IBM Macintosh?

The first thing the boneheads at IBM will do is change the name of the Mac to some dopey number. They can't call it the IBM Macintosh, because it sounds funny with the two *Ms* — one at the end of *IBM* and one at the beginning of *Mac* — running together. Besides, I'm sure that the IBM corporate culture deplores naming a computer after a fruit. So it would have to be called something like the IBM 6000ZT or some other nonsense.

For as long as the personal-computer industry has existed, there's been an underlying trend of abandoning the roots of personal computing and a return to the trend that was epitomized by centralized control. And guess who wants to provide that control?

The original personal computer was the Altair, which was introduced on the cover of *Popular Electronics* in January 1975. True, there were other, less successful experiments, and a couple of them preceded the Altair. But the Altair was the first big success and the first practical personal computer. It was sold as a computer kit. A chain of stores, in fact, cropped up around the country. The stores were called Computer Kits and specialized in the Altair. Within two years, the scene was crazy with Altair clones and Byte Shops and a slew of magazines supporting what were called microcomputers. By mid-1977 things were at full speed. The leading machines were the Altair, the SOL, the Apple II, and the PET, followed quickly by the IMSAI, the Polymorphics, the Cromemco, the Radio Shack TRS-80, and eventually the Northstar and the Heath. There were a few others such as the Sphere and the Jupiter and a lot that I've forgotten about.

One by one, they began to fall. What specifically happened to each is not important. What is important is that from the day MITS sold out the Altair to a disk-drive maker called Pertec, the trend has been clear: to expurgate the roots of personal computing. It's been interesting to watch.


First Pertec buys Altair, and within a year, it has completely eliminated the name *Altair*. In no time at all, it's given up making systems altogether. Boom! There goes Dad. The founder of IMSAI forms Computerland and folds IMSAI. Just how ludicrous this is becomes apparent a few years later, when Computerland brings out a computer called the Computerland computer. The makers of the SOL computer simply close their doors. They aren't broke; they've simply quit business. One after another, the companies drop their trademarks, go broke, move into specialty markets, or get bored. Even Radio Shack changes the name of its machines to Tandy computers.

The Death Knell of History

Of the original computer makers of the mid-1970s, only Apple has endured as a reminder of the roots of desktop computing, née personal computing, née microcomputing. To most newcomers, IBM invented desktop computing. "Gee, wasn't the IBM PC the first personal computer?" Don't laugh. Plenty of people think that.

It's almost as if IBM were somehow behind it all. Like the mastermind who kills all the witnesses. "Oh, I see a terrible accident has befallen old Mrs. Murphy. Fell off the roof, you say? Did you hear about O'Brien? Crushed in a garbage compactor at work. They were the last two witnesses to the Dunleavy murder. A shame those accidents happened."

Of course, there's no apparent connection. How convenient. Despite all the money to be made manufacturing small computers, one pioneering company after another disappears or changes identity. The Byte Shops are mostly gone too. Computer Kits are long gone. The Altair is almost completely forgotten. Only two companies remain. One in hardware, the other in software. Apple and Microsoft! Microsoft is under attack, and Apple is in bed with the devil. We can guess who's on top and what the offspring's last name will be. Microsoft will have to fight an octopuslike old-boys network — having chosen a tough enemy.

Let's face it, both Apple and Microsoft are part of a long-term trend to rewrite the history of the personal computer. As usual, the victors write the history. It's likely that 20 years from now, Apple will be as fondly remembered as the Sphere or the Altair are today — by nobody. 

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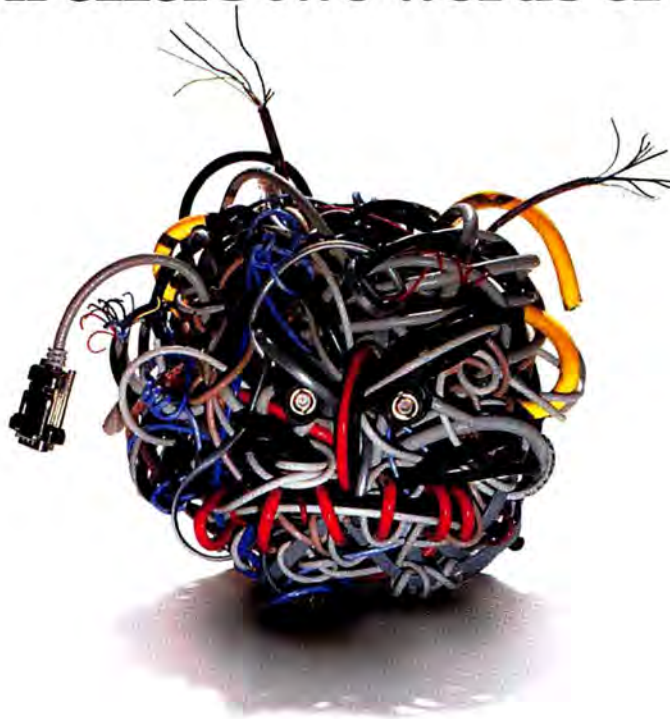
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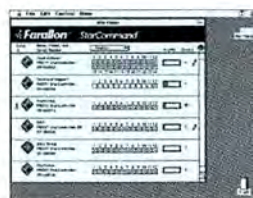
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